# **APPENDIX A**

# **ENGINEERING APPENDIX**

# ATTACHMENT B Plates, Core Boring Logs, Laboratory Reports, Jetty Stability Analysis

# PART 2

Jacksonville Harbor Navigation Study, Duval County, Florida

DRAFT
INTEGRATED GENERAL REEVALUATION
REPORT II AND SUPPLEMENTAL
ENVIRONMENTAL IMPACT STATEMENT

| DRI   | LLING   | LO        | G (Cont. Sheet)  | Jackso           |           | Distr            | ict   |                            | SHEET 2<br>OF 2 S |         |
|-------|---|-----------|--|------------------|-----------|------------------|---|----------------------------|-------------------|---------|
| ROJEC | т   |           |  | COORDINA         |           |                  |   | UM HORIZONTAL              | VERTICAL          |         |
| Jack  | sonville Ha   | rbor (    | GRR  | State F          | Plane,    | FLE              | (U.S  | . Ft.) NAD83               | MLLW              |         |
|       | ON COORDI   |           |  | ELEVATIO         |           | OF B             | ORIN  |                            |                   |         |
| X = 4 | 87,318  | 1         | ,201,495   | -43.0 F          | t.        | ·                | 1   |                            |                   |         |
| ELEV. | DEPTH   | LEGEND    | CLASSIFICATION OF MATERIA  | LS               | REC.      | BOX OR<br>SAMPLE | RQD<br>OR<br>UD   | REMARKS                    | BLOWS/<br>0.5 FT. | N-VALUE |
|       | pe  |           | moderately hard, slightly weathered<br>grained, pitted, sand filled pits, mois<br>5Y 7/2 light gray                          |                  |           |                  |   |                            |                   |         |
| -63.0 | NOTES:  1. USACE Jacksonville is the cu   |           |  | 90               | RUN<br>#1 | RQD<br>65        | 4 x 5-1/2" Diamond Im<br>DT = 3 min<br>HP = 300 p<br>DFR = 25 °     | s<br>si                    |                   |         |
| -03.0 | 20.0  | T - T     | NOTES:   |                  |           |                  |   | 140# hammer w/30" drop use | d with            |         |
|       | NOTES:  1. USACE Jacksonville is the cust these original files.  2. Soils are field visually classifie accordance with the Unified Soils Classification System. |           | odian for  |                  |           |                  | 2.0' split spoon (1-3/8" I.D. x 2<br>Abbreviations:                 |                            |                   |         |
|       |   |           | in   |                  |           |                  | DT = Drill Time. HP = Hydraulic Pressure. DFR = Drill Fluid Return. |                            |                   |         |
|       |   |           | 3. Set 50.5 ft. of 6" flush joint steel  | casing           |           |                  |   |                            |                   |         |
|       |   |           | <ol> <li>Water depth recorded at start of<br/>operations and referenced to the tid<br/>at the Dames Point Bridge.</li> </ol> |                  |           |                  |   |                            |                   |         |
|       |   |           | 5. Water depth of -43.8 ft. recorded AM on 1/24/2010. Tide gage reading ft. mllw   |                  |           |                  |   |                            |                   |         |
|       |   |           | 6. Compressive Strength Test of Ro<br>At Elevation -58.8' to -59.5" = 340 P  | ock Core<br>PSI. |           |                  |   |                            |                   |         |
|       |   |           | 7. Additional lab test results were a February 2011  | dded             |           |                  |   |                            |                   |         |
|       |   |           | 8. Laboratory Testing Results  |                  |           |                  |   |                            |                   |         |
|       |   |           | SAMPLE SAMPLE LABORA<br>ID DEPTH CLASSIFIC   |                  |           |                  |   |                            |                   |         |
|       |   |           | 1 0.0/1.5 SP<br>3 3.0/4.5 MH   | * -<br>* -       |           |                  |   |                            |                   |         |
|       | *Lab visual classification based on curve. No Atterberg limits.   | gradation |  |                  |           |                  |   |                            |                   |         |
|       |   |           |  |                  |           |                  |   |                            |                   |         |
|       |   |           |  |                  |           |                  |   |                            |                   |         |
|       |   |           |  |                  |           |                  |   |                            |                   |         |
|       |   |           |  |                  |           |                  |   |                            |                   |         |
|       | NDM 402   |           |  |                  |           |                  |   |                            |                   |         |

| DPI   | LLING         | 10         | DIVISION  | 200     |         | LATIC            |                 |   | SHEET 1            | 7.7     |
|-------|---------------|------------|---|---------|---------|------------------|-----------------|---|--------------------|---------|
| 100   |               | LUI        | South Atlantic  | _       |         |                  | ille Di         |   | OF 3 SH            | EETS    |
| . PRO |               | 413.4      | 000   | 1330    |         |                  |                 | SYSTEM/DATUM HORIZONTAL                             | VENTOR             |         |
| -     | acksonville   | 20000      |   | 10.     |         |                  |                 |   | VERTICAL           |         |
|       | NG DESIG      |            | E WIDENER N   LOCATION COORDINATES  | 11.     |         |                  |                 | ne, FLE (U.S. Ft.) NAD83 RER'S DESIGNATION OF DRILL | MLLW<br>AUTO HAMME | D       |
| C     | B-JHPMO       | 9-10       | X = 486,647 Y = 2,200,72  |         |         |                  |                 |   | MANUAL HAM         |         |
|       | LING AGEN     |            | CONTRACTOR FILE   | NO. 12. | то      | TAL              | SAMPL           | FS  | UNDISTURBED        | (UD)    |
| NAM   | hallenge E    | ngin<br>ER | eering & Testing, Inc.   2009D08  | -       | 1 5-6   |                  |                 | 28  | 0                  |         |
|       | larvin Stric  |            |   | 200     |         |                  |                 | ER CORE BOXES 2                                     |                    | -       |
| -     | CTION OF      | BORII      | IG DEG. FROM BEARING VERTICAL   | 14.     | EL      | EVAT             | ION G           | ROUND WATER TIDAL                                   |                    |         |
|       | /ERTICAL      |            |   | 15.     | DA      | TE B             | ORING           | STARTED 01-21-10                                    | 01-21-1            |         |
| THIC  | KNESS OF      | OVE        | BURDEN N/A  | 16.     | EL      | EVAT             | ION T           | OP OF BORING -18.9 Ft.                              |                    |         |
| DEPT  | TH DRILLE     | INT        | ROCK N/A  | 17.     | то      | TAL              | RECOV           | VERY FOR BORING 84 %                                |                    |         |
| -     | 2 - 2 - 2 - 2 | A 12 2     | 100 A   | 18.     | 100     |                  | -               | ND TITLE OF INSPECTOR                               |                    |         |
| 101/  | AL DEPTH      | OF BO      | RING 42.0 Ft.   |         |         | _                |                 | npson III, Civil Engineer                           |                    |         |
| LEV.  | DEPTH         | LEGEND     | CLASSIFICATION OF MATERIALS   | R       | έc.     | BOX OR<br>SAMPLE | RQD<br>OR<br>UD | REMARKS   | BLOWS/<br>0.5 FT.  | N-VALUE |
| 18.9  | 0.0           |            |   |         |         |                  |                 | -18.9   |                    |         |
|       | -             | 111        | SAND, silty, mostly angular to subangular                                   | ar      |         |                  |                 | 10.0  | 0                  |         |
|       |               |            | fine-grained sand-sized quartz, little silt, 5Y 4/2 olive gray (SM)         |         | 53      | 1                |                 | SPT Sampler   | 0                  |         |
|       | 2             | [H]        | ar meranic grey (con)   | 1       | 00      | ,                |                 | 127   | 0                  | 0       |
| 20.4  | 1.5           | 1111       | SILT, organic-L, nonplastic, very soft, tra                                 | ice     | -       | -                | 1               | -20.4   |                    |         |
| - 1   | -             | 6.55       | angular to subangular fine-grained  | 100     | 100     |                  |                 | ODT 0   | 0                  | -       |
|       |               |            | sand-sized quartz, wet, 5Y 4/2 olive gray (OL)                              |         | 100     | 2                |                 | SPT Sampler   | -                  | 0       |
|       | -             |            |   |         |         |                  |                 | -21.9   | 0                  |         |
|       |               | ijij       |   |         | Ш       | 1.0              |                 |   | 0                  |         |
|       |               |            |   |         | 67      | 3                |                 | SPT Sampler   | 0                  | 0       |
|       |               |            |   |         |         |                  |                 | -23.4   | 0                  | 1157    |
| 1     | _             | 111        |   |         | 1       |                  | Ш               |   | 0                  |         |
|       | -             |            |   | 1       | 40      | 4                |                 | SPT Sampler   | 0                  | 0       |
| - 1   | -             | ήή         |   |         |         |                  |                 | -24.9   | 0                  | U       |
| -     | -             |            | At El24.9 Ft., moist  |         |         |                  |                 |   | 0                  |         |
|       |               | liii       |   |         | 80      | 5                |                 | SPT Sampler   | 0                  | 1       |
|       | -             |            |   | - 1     | 7       | F 1              |                 | -26.4   | 0                  | 0       |
|       |               | Bii        | At El26.4 Ft., low plasticity, trace angu<br>shell up to 3/8", organic odor | lar     |         |                  | 1 1             |   | 0                  |         |
|       | 7             | HIII       | snell up to 3/8", organic odor  |         | 67      | 6                |                 | SPT Sampler   | 0                  |         |
|       |               | jjij       |   |         |         |                  |                 | -27.9   | 0                  | 0       |
|       | -             |            | At El27.9 Ft., soft   |         |         |                  |                 | -21.3   | 0                  |         |
|       |               |            |   | 2       | 100     | 7                |                 | SPT Sampler   | -                  |         |
|       | -1            |            |   |         |         | 1                |                 |   | 1                  | 2       |
|       |               | ilii       |   | 1       |         | -                |                 | -29.4   | 0                  |         |
| - 6   |               |            |   |         | 100     | 0                |                 | COT Committee                                       | -                  |         |
|       | -             |            |   |         | 100     | 8                |                 | SPT Sampler   | _                  | 2       |
|       | 5,            |            | At El30.9 Ft., discontinue shell  | 4       |         |                  |                 | -30.9   | 1                  |         |
|       |               |            | THE ENTERON TEL GISCOMUNIC STICIL   |         | gigcari |                  |                 | 24/27/200   | 0                  |         |
|       | -             |            |   | 1       | 100     | 9                |                 | SPT Sampler   | 1                  | 2       |
|       |               |            | KIELE CALLED  | ٥       | Щ       |                  |                 | -32.4   | 1                  | A.      |
|       | 1             |            | At El32.4 Ft., medium plasticity, trace angular shell up to 1/8"            |         |         |                  |                 |   | 0                  | -7      |
|       |               |            | 3   | 4       | 100     | 10               |                 | SPT Sampler   | 0                  | 0       |
| _ : 1 |               |            |   |         |         | М                | )               | -33.9   | 0                  | 0       |

| DRI            | ILLING           | INSTALLATION Jacksonville District Jacksonville District Jacksonville District |   |   |      |                  |                 |       |                                       |                   |         |               |
|----------------|------------------|--|---|---|------|------------------|-----------------|-------|---------------------------------------|-------------------|---------|---------------|
| PROJEC         | т                |  |   | COORDINA                                  |      |                  |                 | UM    | HORIZONTAL                            | VERTICAL          |         | 1             |
|                | sonville Ha      | arbor (  | GRR   | State P                                   |      |                  |                 |       | NAD83                                 | MLLW              |         |               |
|                | ON COORDI        |  |   | ELEVATIO                                  |      |                  |                 |       | · · · · · · · · · · · · · · · · · · · | •                 |         | 1             |
| X = 4          | 486,647          | Y = 2  | ,200,722  | -18.9 F                                   | t.   |                  |                 |       |                                       |                   |         |               |
| ELEV.          | DEPTH            | LEGEND   | CLASSIFICATION OF MATERI  | ALS                                       | REC. | BOX OR<br>SAMPLE | RQD<br>OR<br>UD |       | REMARKS                               | BLOWS/<br>0.5 FT. | N-VALUE |               |
|                |                  |  |   |   | 100  | 11               |                 | -35.4 | SPT Sampl                             | er 2<br>2<br>1    | 3       | -             |
|                |                  |  |   |   | 100  | 12               |                 | -36.9 | SPT Sampl                             | er 0<br>1         | 2       | -             |
| -38.2          | 19.3             |  | SAND, silty, mostly angular to sub  | angular                                   | 93   | 13               |                 | -38.4 | SPT Sampl                             | er 2<br>3         | 5       | -             |
| -38.9          | 20.0             |  | fine to medium-grained sand-sized<br>little silt, trace angular to subangul<br>to 1/8", moist, 5Y 4/1 dark gray (S<br>SILT, organic-L, low plasticity, soft<br>organic matter, moist, 5Y 4/1 dark | l quartz,<br>ar shell up<br>M)<br>, trace | 80   | 14               |                 | -39.9 | SPT Sampl                             | 2 3<br>3          | 5       | -             |
|                |                  |  | At El39.9 Ft., few organic matter   | gray (OL)                                 | 87   | 15               |                 | -41.4 | SPT Sampl                             | er 1 2            | 3       | -             |
|                |                  |  |   |   | 100  | 16               |                 | -42.9 | SPT Sampl                             | er 2<br>1<br>2    | 3       | -             |
|                |                  |  |   |   | 100  | 17               |                 | -44.4 | SPT Sampl                             | er 0<br>2<br>3    | 5       | -             |
|                |                  |  |   |   | 100  | 18               |                 | -45.9 | SPT Sampl                             | er 2<br>3<br>5    | 8       | -             |
| -46.2<br>-46.7 | 27.3             |  | CLAY, lean, low plasticity, soft, mo<br>5GY 4/1 dark greenish gray (CL)<br>LIMESTONE, sandy, sparsely foss<br>very soft, highly weathered, moist,   |   | 87   | 19               |                 | -47.4 | SPT Sampl                             | 3 2 5             | 7       | -             |
|                |                  |  | 5Y 6/1 gray   |   | 73   | 20               |                 | -48.9 | SPT Sampl                             | 11<br>8<br>42     | 50      | -             |
|                | Highly Weathered |  | At El48.9 Ft., massive bedding, orientation   | bedding                                   | 87   | 21               |                 | -50.4 | SPT Sampl                             | 25                | 27      | -             |
|                | Highly W.        |  |   |   | 73   | 22               |                 | -51.9 | SPT Sampl                             | er 11<br>4        | 21      | †<br> -<br> - |
|                |                  |  |   |   | 73   | 23               |                 | -53.4 | SPT Sampl                             | 9<br>9<br>9       | 18      | †<br> -<br> - |
|                |                  | III  | ∼At El53.4 Ft., moderately hard   |   | 100  | 24               | 1               | -53.4 | SPT Sampl                             | er 50             |         | t             |

| DRI    | LLING            | LOC               | G (Cont. Sheet)   | INSTALLATION Jacksonville District Jacksonville District Jacksonville District Jacksonville District |       |                  |                 |                   |                        |        |                    |         |
|--------|------------------|-------------------|---|--|-------|------------------|-----------------|-------------------|------------------------|--------|--------------------|---------|
| PROJEC | т                |                   |   | COORDINA   |       |                  |                 | UM                | HORIZONTAL             | VER    | TICAL              |         |
| Jack   | sonville Ha      | arbor (           | GRR   | State P  | lane, | FLE              | (U.S            | . Ft.)            | NAD83                  | l N    | <b>/ILLW</b>       |         |
| OCATIO | ON COORDI        | NATE              | S   | ELEVATIO   | н тор | OF B             | ORIN            | G                 |                        |        |                    |         |
| X = 4  | 86,647           | _                 | ,200,722  | -18.9 F  | t.    |                  |                 |                   |                        |        |                    |         |
| ELEV.  | DEPTH            | LEGEND            | CLASSIFICATION OF MATERIAL  | LS   | REC.  | BOX OR<br>SAMPLE | RQD<br>OR<br>UD |                   | REMARKS                |        | BLOWS/<br>0.5 FT.  | N-VALUE |
|        |                  | III               |   |  |       |                  |                 | -54.9             | Advanced Bo            | ring   |                    |         |
|        |                  | III               |   |  | 67    | 25               |                 | -55.2             | SPT Sample             | er     | 50/0.3'            |         |
|        |                  | III               |   |  |       |                  |                 | -56.4             | Advanced Bo            | ring   |                    |         |
|        | · pered          | III               | At El56.4 Ft., soft   |  |       |                  |                 | 00.4              |                        |        | 9                  |         |
|        | Highly Weathered | III               |   |  | 67    | 26               |                 | -57.9             | SPT Sample             | er     | <del>-4</del><br>3 | 7       |
|        | HigiH            |                   | ∼At El57.9 Ft., 5Y 7/2 light gray   |  |       |                  |                 | -37.9             |                        |        | 2                  |         |
|        |                  | III<br>III<br>III |   |  | 80    | 27               |                 |                   | SPT Sample             | er     | 7                  | 10      |
|        |                  | III               |   |  |       |                  |                 | -59.4             |                        |        | 9                  |         |
|        |                  | III               |   |  | 80    | 28               |                 |                   | SPT Sample             | er     | 28<br>50           | 78      |
| -60.9  | 42.0 ▼           | ŢŢŢ               | NOTES:  |  |       |                  |                 | -60.9<br>140# har | mmer w/30" drop use    | d with |                    |         |
|        |                  |                   | USACE Jacksonville is the custo these original files.   | dian for   |       |                  |                 | 2.0' split        | spoon (1-3/8" I.D. x 2 | 2" O.[ | O.).               |         |
|        |                  |                   | Soils are field visually classified in accordance with the Unified Soils Classification System.     | in   |       |                  |                 |                   |                        |        |                    |         |
|        |                  |                   | 3. Set 35.5 ft. of 6" flush joint steel   | casing   |       |                  |                 |                   |                        |        |                    |         |
|        |                  |                   | Water depth recorded at start of operations and referenced to the tidat the Blount Island Terminal. | drilling<br>al station   |       |                  |                 |                   |                        |        |                    |         |
|        |                  |                   | 5. Water depth of -19.6 ft. recorded<br>AM on 1/21/2010. Tide gage readin<br>ft. mllw               | at 08:25<br>g of +0.7  |       |                  |                 |                   |                        |        |                    |         |
|        |                  |                   | Additional lab test results were a<br>February 2011   | dded   |       |                  |                 |                   |                        |        |                    |         |
|        |                  |                   | 7. Laboratory Testing Results   |  |       |                  |                 |                   |                        |        |                    |         |
|        |                  |                   | SAMPLE SAMPLE LABORA ID DEPTH CLASSIFIC   |  |       |                  |                 |                   |                        |        |                    |         |
|        |                  |                   | 12 16.5/18.0 MH<br>15 21.0/22.5 MH  |  |       |                  |                 |                   |                        |        |                    |         |
|        |                  |                   | *Lab visual classification based on g<br>curve. No Atterberg limits.                                | gradation  |       |                  |                 |                   |                        |        |                    |         |
|        |                  |                   |   |  |       |                  |                 |                   |                        |        |                    |         |
|        |                  |                   |   |  |       |                  |                 |                   |                        |        |                    |         |
|        |                  |                   |   |  |       |                  |                 |                   |                        |        |                    |         |
|        |                  |                   |   |  |       |                  |                 |                   |                        |        |                    |         |

| DRI    | LLING                | LOG     | DIVISION   | 10000 | TALL |                  |                 | A. Land          |  | SHEET 1           |         |
|--------|----------------------|---------|--|-------|------|------------------|-----------------|------------------|--|-------------------|---------|
| . PRO  | 90000                |         | South Atlantic   |       |      |                  | _               | strict           | o Domeste  | OF 2 SH           | EET     |
|        | acksonvill           | o Harbe | or GBB   | 1335  |      | C. 157.00        |                 | SYSTEM/DATUM     | e Remarks  | VERTICAL          |         |
| 105    |                      |         | R CHANNEL  |       |      |                  |                 | e, FLE (U.S. Ft  | The state of the s | MLLW              |         |
|        | ING DESIG            |         |  | 11.   |      |                  |                 | ER'S DESIGNATI   |  | UTO HAMME         | R       |
| C      | B-JHPMC              | 9-11    | X = 488,659 Y = 2,201,799  |       | E    | Died             | rich D          | -50 Truckrig     |  | MANUAL HAM        |         |
|        | LING AGE             |         | CONTRACTOR FILE N  |       | TOT  | TAL S            | SAMPI           | ES               |  | NDISTURBED        | (UD     |
|        | hallenge             |         | ering & Testing, Inc. 2009D08  | 1     | 100  |                  |                 |                  | 11   | 0                 |         |
|        | larvin Stri          |         |  | 13.   | TOT  | TAL I            | NUMB            | ER CORE BOXES    | 0  |                   |         |
|        | CTION OF             |         | DEG. FROM BEARING VERTICAL   | 14.   | ELE  | VAT              | ION G           | ROUND WATER      | TIDAL  |                   |         |
|        | VERTICAL<br>INCLINED |         | VERTICAL   | 15.   | DAT  | TE B             | DRING           |                  | <b>STARTED</b> 01-20-10  | 01-20-1           |         |
| . THIC | KNESS OF             | OVERB   | BURDEN N/A   |       |      |                  | 2032.0          | OP OF BORING     | -45.1 Ft.  |                   |         |
| 7. DEP | TH DRILLE            | D INTO  | ROCK N/A   | 17.   | 1000 | 2.75             | 30.300          | ERY FOR BORIN    | 30 30 30 30 30 30 30 30 30 30 30 30 30 3   |                   |         |
| в. тот | AL DEPTH             | OF BOR  | ING 19.8 Ft.   | 10.   | 100  |                  | -               | npson III, Civil |  |                   |         |
|        |                      |         |  | -     | _    | _                | 11101           | ilpsoiliti, Olvi | Ligition   | × .               | ш       |
| ELEV.  | DEPTH                | LEGEND  | CLASSIFICATION OF MATERIALS  | R     | έc.  | BOX OR<br>SAMPLE | RQD<br>OR<br>UD |                  | REMARKS  | BLOWS/<br>0.5 FT. | N-VALUE |
| -45.1  | 0.0                  |         | 5405 Tr  |       |      |                  |                 | -45.1            |  |                   |         |
| -45.3  | 0.2                  | 1:11    | SAND, silty, mostly angular to subangular<br>fine to medium-grained sand-sized quartz,   |       |      |                  |                 |                  |  | 9                 |         |
|        |                      |         | little silt, few angular to subangular shell u   |       | 73   | 1                |                 |                  | SPT Sampler  | 8                 | 15      |
| - 1    | -                    | 1:11    | to 1-1/2", wet, 5Y 4/3 olive (SM) SAND, poorly-graded with silt, mostly  |       |      |                  |                 | -46.6            |  | 7                 | 15      |
| -47.1  | 2.0                  |         | angular to subangular fine to  |       |      |                  |                 | -10.0            |  | 4                 |         |
| -47.1  |                      | E III   | medium-grained sand-sized quartz, little<br>angular to subangular shell up to 3/8", few  | /     | 67   | 2                |                 |                  | SPT Sampler  | 3                 |         |
|        |                      |         | \silt, wet, 5Y 5/1 gray (SP-SM)  |       | ,    | -                |                 |                  | or r campion   | 6                 | 9       |
| -48.4  | 3.3                  | BIII    | LIMESTONE, very soft, highly weathered, fine grained, 5Y 7/4 pale yellow   | V.    | -    |                  |                 | -48.1            |  |                   |         |
|        |                      | 11      | CLAY, fat, medium plasticity, hard, dry,   | -1    |      | D)               |                 |                  |  | 8                 |         |
|        | _                    |         | 5BG 5/1 greenish gray (CH)   |       | 93   | 3                |                 |                  | SPT Sampler  | 7                 | 30      |
|        |                      |         | At El49.1 Ft., 5Y 7/1 light gray   |       |      |                  |                 | -49.6            |  | 23                |         |
| -50.1  | 5.0                  |         | At El49.9 Ft., some angular to subangular  | ar    |      |                  |                 |                  |  | 7                 |         |
|        | 11                   | ITI     | fine to medium-grained sand-sized quartz   |       | 93   | 4                |                 |                  | SPT Sampler  | 47                |         |
|        |                      |         | LIMESTONE, sparsely fossiliferous, soft, highly weathered, fine grained, moist,  |       |      | m                |                 | -51.1            | Sala de la companya d | 31                | 78      |
| 1      | _                    | I I I   | 5Y 8/2 pale yellow   | 1     |      | 7                |                 | -51.1            |  | 20                |         |
|        |                      | III     |  |       | 37   | 5                |                 |                  | CDT Complex  | 25                |         |
|        |                      | I III   |  | ,     | 07   | 5                |                 |                  | SPT Sampler  | -                 | 55      |
|        | 1 1                  | HITI.   | At El52.6 Ft., moderately hard, slightly   |       |      |                  | - 8             | -52.6            |  | 30                |         |
| FC 4   |                      | ITI     | weathered  | 1     | 00   | 6                |                 | 50.4             | SPT Sampler  | 37                |         |
| -53.4  | 8.3                  | III -   | LIMESTONE, sandy, non-fossiliferous, ve  | rv    |      |                  |                 | -53.4            |  | 50/0.3'           | -       |
| -54.1  | 9.0                  | III     | soft   |       |      |                  |                 |                  |  |                   |         |
|        | 5 0                  |         | LIMESTONE, sparsely fossiliferous, hard,   |       |      |                  |                 |                  |  |                   |         |
|        |                      |         | slightly weathered, thick bedding, bedding<br>orientation, porous  | 9     |      |                  |                 |                  |  |                   |         |
|        | _ ]                  |         | Separation of the Parket State of the Parket S |       |      |                  |                 |                  |  |                   |         |
|        |                      |         |  |       |      |                  |                 | 4 x 5-1/         | 2" Diamond Impreg  | nated Bit         |         |
|        | _                    |         |  |       | 58 F | RUN              | RQD             |                  | DT = 4 mins  |                   |         |
|        | - 8                  | 5       |  |       |      | #1               | 25              |                  | HP = 300 psi<br>DFR = 25 %   |                   |         |
| -57.1  | 12.0                 |         | . Mariana Company  |       |      |                  |                 |                  |  |                   |         |
|        | 2 1                  | ITI     | LIMESTONE, soft, highly weathered  |       |      |                  |                 |                  |  |                   |         |
|        | . 1                  | I I I   |  |       |      |                  |                 |                  |  |                   |         |
|        | _                    | ITI     |  |       |      |                  |                 |                  |  |                   |         |
|        | - 3                  | TIT     |  | .0    |      |                  |                 | -58.9            |  |                   |         |
|        |                      | III     |  |       |      |                  |                 |                  |  | 6                 |         |
|        |                      | ITI     |  |       | 53   | 7                |                 |                  | SPT Sampler  | 7                 |         |
|        | 4                    | TOT     |  |       |      |                  |                 |                  |  |                   | 14      |

| DRI     | LLING   | LO                       | G (Cont. Sheet)  | INSTALLA*  Jackso     |       | Distr            | ict             |   |   | SHEET 2<br>OF 2 SI | HEETS   |
|---------|---|--------------------------|--|-----------------------|-------|------------------|-----------------|---|---|--------------------|---------|
| PROJEC  | т   |                          |  | COORDINA              |       |                  |                 | UM  | HORIZONTAL                                    | VERTICAL           |         |
| Jack    | sonville Ha   | rbor                     | GRR  | State F               | lane, | FLE              | (U.S.           | Ft.)  | NAD83   | MLLW               |         |
| LOCATIO | ON COORDII  | NATE                     | s  | ELEVATIO              | N ТОР | OF B             | ORIN            | 3   |   |                    |         |
| X = 4   | 188,659   |                          | ,201,799   | -45.1 F               | t.    |                  |                 |   |   |                    |         |
| ELEV.   | DEPTH   | LEGEND                   | CLASSIFICATION OF MATERIAL   | LS                    | ĸĚC.  | BOX OR<br>SAMPLE | RQD<br>OR<br>UD |   | REMARKS                                       | BLOWS/<br>0.5 FT.  | N-VALUE |
|         | eathered  | III<br>III<br>III<br>III | At El60.4 Ft., very soft   |                       | 53    | 7                |                 | -60.4   | SPT Sampl                                     | er 7               |         |
|         | ▼ Highly Weathered  |                          | NATI CAOTA mandagatah hand ali   | - ln 41               | 100   |                  |                 | -61.9   | SPT Sampl                                     | 18                 | 30      |
|         |   |                          | At El61.9 Ft., moderately hard, sliq<br>weathered                                | gntiy                 | 100   | 9                |                 | -62.2   | SPT Sampl Advanced Bo                         |                    |         |
|         | Slightly Weathered  |                          |  |                       |       |                  |                 | -63.4   |   | 6                  |         |
| -64.9   |   |                          |  | 100                   | 10    |                  | -64.9           | SPT Sampl                                     | er 11<br>12                                   | 23                 |         |
|         | NOTES:  1. USACE Jacksonville is the cu   |                          |  | dian for              |       |                  |                 |   | mmer w/30" drop use<br>spoon (1-3/8" I.D. x 2 |                    |         |
|         | USACE Jacksonville is the custhese original files.     Soils are field visually classified. |                          |  |                       |       |                  |                 | ations:<br>Drill Time.<br>Hydraulic Pressure. |   |                    |         |
|         |   |                          | accordance with the Unified Soils<br>Classification System.                      |                       |       |                  |                 |   | = Ďrill Fluid Return.                         |                    |         |
|         |   |                          | Set 55.5 ft. of 6" flush joint steel     Water depth recorded at start of        | _                     |       |                  |                 |   |   |                    |         |
|         |   |                          | operations and referenced to the tidat the Blount Island Terminal.               |                       |       |                  |                 |   |   |                    |         |
|         |   |                          | 5. Water depth of -47.2 ft. recorded AM on 1/20/2010. Tide gage reading ft. mllw | at 10:41<br>g of +2.1 |       |                  |                 |   |   |                    |         |
|         |   |                          | 6. Compressive Strength Test of Ro<br>At Elevation -54.6' to -55.1' = 815 PS     |                       |       |                  |                 |   |   |                    |         |
|         |   |                          | 7. Laboratory Testing Results  SAMPLE SAMPLE LABORA                              | TORY                  |       |                  |                 |   |   |                    |         |
|         |   |                          | ID DEPTH CLASSIFIC<br>   | CATION                |       |                  |                 |   |   |                    |         |
|         |   |                          | *Lab visual classification based on g<br>curve. No Atterberg limits.             | gradation             |       |                  |                 |   |   |                    |         |
|         |   |                          |  |                       |       |                  |                 |   |   |                    |         |
|         |   |                          |  |                       |       |                  |                 |   |   |                    |         |
|         |   |                          |  |                       |       |                  |                 |   |   |                    |         |
|         |   |                          |  |                       |       |                  |                 |   |   |                    |         |
|         |   |                          |  |                       |       |                  |                 |   |   |                    |         |
|         |   |                          |  |                       |       |                  |                 |   |   |                    |         |

| DPI  | LLING         | OG       | DIVISION   | INST                              |     |                  |                 |  | SHEET 1           | 7.00    |  |  |  |  |
|------|---------------|----------|--|-----------------------------------|-----|------------------|-----------------|--|-------------------|---------|--|--|--|--|
| PRO. | 40.000        | -06      | South Atlantic   | _                                 |     |                  | ville Di        |  | OF 2 SH           | IEETS   |  |  |  |  |
|      |               | Harden   | CDD  | 1337                              | 200 | 1000             |                 | SYSTEM/DATUM HORIZONTAL  | VERTICAL          |         |  |  |  |  |
| 0.50 | acksonville   |          | R CHANNEL  | 10.                               |     |                  |                 | ne, FLE (U.S. Ft.) NAD83   | MLLW              |         |  |  |  |  |
|      | ING DESIGN    |          | LOCATION COORDINATES   | 11.                               |     |                  |                 | NAME AND ADDRESS OF THE OWNER, WHEN PERSON O | AUTO HAMMI        |         |  |  |  |  |
|      | B-JHPM09      |          | X = 490,672 Y = 2,201,783  |                                   | I   | Died             | Irich D         | THE PARTY OF THE P | MANUAL HAN        |         |  |  |  |  |
|      | LING AGEN     |          | ring & Testing, Inc. 2009D08   | 12.                               | TOT | TAL              | SAMPL           | LES DISTURBED  | UNDISTURBED<br>0  | (UD)    |  |  |  |  |
| NAM  | E OF DRILL    | ER       | ming to resuling, me   | 13.                               | TO  | TAL              | NUMB            | ER CORE BOXES 1  | •                 |         |  |  |  |  |
|      | larvin Strick |          | A Committee of the Comm | 14.                               | ELE | VAT              | ION G           | ROUND WATER TIDAL  |                   |         |  |  |  |  |
|      | CTION OF E    | BORING   | DEG. FROM BEARING VERTICAL   | 0.01                              |     |                  |                 | STARTED  | COMPLETE          | D       |  |  |  |  |
|      | NCLINED       |          |  | 15. DATE BORING 01-20-10 01-20-10 |     |                  |                 |  |                   |         |  |  |  |  |
| THIC | KNESS OF      | OVERBU   | URDEN N/A  | 16.                               | ELE | VAT              | TON T           | OP OF BORING -44.0 Ft.   |                   |         |  |  |  |  |
| DEPT | TH DRILLED    | INTO R   | OCK N/A  |                                   |     | 2.70             | 190 5 50        | ERY FOR BORING 87 %  |                   |         |  |  |  |  |
| TOTA | AL DEPTH O    | F BORI   | NG 19.9 Ft.  | 18.                               |     |                  |                 | ND TITLE OF INSPECTOR  |                   |         |  |  |  |  |
| 1    |               |          | 7,000,111  | 4                                 | _   |                  |                 | npson III, Civil Engineer  | 5.                | ш       |  |  |  |  |
| LEV. | DEPTH         | LEGEND   | CLASSIFICATION OF MATERIALS  | RÉ                                | c.  | BOX OR<br>SAMPLE | ROD<br>OR<br>UD | REMARKS  | BLOWS/<br>0.5 FT. | N-VALUE |  |  |  |  |
| 14.0 | 0.0           |          |  |                                   |     |                  |                 | -44.0  |                   |         |  |  |  |  |
|      |               |          | SAND, silty, mostly angular to subangular<br>fine to medium-grained sand-sized quartz,   |                                   |     |                  |                 |  | 0                 |         |  |  |  |  |
|      |               | 1+1+     | little silt, few angular to subangular shell up  | 6                                 | 7   | 1                |                 | SPT Sampler  | 2                 | (2)     |  |  |  |  |
| 1    | -             | 1111     | to 3/4", wet, 5Y 4/4 olive (SM)  |                                   |     |                  |                 | -45.5  | 3                 | 5       |  |  |  |  |
|      |               | 1111     |  | 7                                 | 1   |                  | 1 1             | 5.40.0   | 4                 |         |  |  |  |  |
|      | 7             | 1111     | -At El46.0 Ft., moist  | 10                                | 00  | 2                |                 | SPT Sampler  | 5                 |         |  |  |  |  |
|      |               | 1111     |  |                                   |     |                  | ш               | -47.0  | 5                 | 10      |  |  |  |  |
|      | =1            |          | At El47.0 Ft., few angular to subangular   | 10                                | 1   |                  | 1               | -47.0  | 5                 | Ħ       |  |  |  |  |
|      | -             | Itit     | shell up to 1"   | 10                                | 00  | 3                | ш               | SPT Sampler  | 5                 |         |  |  |  |  |
| 1    | _             |          |  | 1.                                |     | Ü                | ш               | No select trace  | - 8               | 13      |  |  |  |  |
|      | _             |          | -At El48.5 Ft., discontinue shell  | 4                                 | +   |                  | 1 1             | -48.5  | 2                 |         |  |  |  |  |
| 1    | -1            | 1111     |  | 8                                 | ١   | 4                | ы               | SPT Sampler  | 3                 |         |  |  |  |  |
|      |               | +1+1     |  | ľ                                 |     | 4                | Ш               |  | 4                 | 7       |  |  |  |  |
|      | 21            | <u> </u> |  | -                                 | +   | -                | 1               | -50.0  | -                 |         |  |  |  |  |
|      |               | +[+[     |  | ١,                                | ,   | 5                | ш               | OPT Complete   | 7                 |         |  |  |  |  |
| - 1  | <u> </u>      | 1111     |  | °                                 | 7   | 5                | Ш               | SPT Sampler  | -                 | 16      |  |  |  |  |
|      | -             | 1111     | -At El51.5 Ft., 5Y 3/2 dark olive gray   | 4                                 | +   | -                |                 | -51.5  | 9                 |         |  |  |  |  |
|      |               |          | some destruction of the same and   | _                                 | ,   |                  |                 | ODT O  | - 5               |         |  |  |  |  |
| 4    | 4             | 1-11     |  | 6                                 | 1   | 6                |                 | SPT Sampler  | 3                 | 14      |  |  |  |  |
|      |               | 1111     | -At El53.0 Ft., 10Y 2.5/1 greenish black   | 5                                 | +   | -                |                 | -53.0  | 7                 |         |  |  |  |  |
|      |               | 1+1+     |  | رند                               |     |                  |                 | 222  | _ 2               |         |  |  |  |  |
|      | -             | 111      |  | 10                                | 00  | 7                |                 | SPT Sampler  | 2                 | 5       |  |  |  |  |
|      | -             | 111      |  | 1                                 | -   |                  |                 | -54.5  | 3                 |         |  |  |  |  |
|      |               | 111      |  |                                   | 5   |                  |                 |  | - 5               |         |  |  |  |  |
|      | -             | 111      |  | 8                                 | 7   | 8                |                 | SPT Sampler  | -                 | 22      |  |  |  |  |
|      | <u> </u>      | 111      |  | 4                                 |     |                  |                 | -56.0  | 11                |         |  |  |  |  |
|      |               | [[]      |  |                                   |     |                  |                 |  | 6                 |         |  |  |  |  |
|      |               |          |  | 9                                 | 3   | 9                |                 | SPT Sampler  | 12                | 24      |  |  |  |  |
|      |               |          |  |                                   |     |                  |                 | -57.5  | 12                | 24      |  |  |  |  |
|      |               | 111      |  |                                   | T   | П                |                 |  | 14                |         |  |  |  |  |
| 58.5 | 14.5          |          |  | 9                                 | 3   | 10               |                 | SPT Sampler  | 16                | 00      |  |  |  |  |
|      | <b>A</b>      | ITI      | LIMESTONE, sandy, sparsely fossiliferous   |                                   |     |                  |                 | -59.0  | 23                | 39      |  |  |  |  |

| DRIL    | LLING                     | LOC                                   | G (Cont. Sheet)   | INSTALLATION  Jacksonville District                        |      |                  |                 |                       |   |        |           | 2<br>SHEET      | rs       |
|---------|---------------------------|---------------------------------------|---|--|------|------------------|-----------------|-----------------------|---|--------|-----------|-----------------|----------|
| PROJECT | •                         |                                       |   | COORDINA   |      |                  |                 | UM                    | HORIZONTAL                                    | VER    | TICAL     |                 | $\dashv$ |
|         | onville Ha                | rbor (                                | GRR   | State F  |      |                  |                 |                       | NAD83   | 1      | 1LLW      |                 |          |
|         | N COORDIN                 |                                       |   | ELEVATIO   |      |                  |                 |                       |   |        |           |                 | ┪        |
|         | 90,672                    |                                       |   | -44.0 F  |      |                  |                 |                       |   |        |           |                 |          |
| ELEV.   | DEPTH                     | LEGEND                                | CLASSIFICATION OF MATERIAL  | •  | REC. | BOX OR<br>SAMPLE | RQD<br>OR<br>UD |                       | REMARKS                                       |        | BLOWS/    |                 |          |
|         | Veath.                    | III<br>III                            | soft, highly weathered, porous, mois 5Y 6/3 pale olive  | it,  |      |                  |                 |                       |   |        | 21        | -               | +        |
|         | Highly V                  | I I I I I I I I I I I I I I I I I I I |   |  | 80   | 11               |                 | -60.5 -               | SPT Sample                                    | er     | 13        | <b></b> − 2:    | 3 -      |
|         | Weathered   Highly Weath. | III<br>III<br>ITI                     | At El60.5 Ft., moderately hard, slig<br>weathered   | ghtly  | 75   | 12               |                 | -60.9                 | SPT Sample                                    | er     | 50/0      | .4'             | 丰        |
| -62.0   | Nea<br>N.Wea              | III                                   |   |  |      |                  |                 | -62.0                 | Advanced Bo                                   | ring   |           |                 | -        |
|         |                           |                                       | SILT, inorganic-H, nonplastic, very h<br>5Y 6/3 pale olive (MH)   | nard, dry,   |      | 40               |                 |                       | 007.0   |        | 26        | _               | Ē        |
|         |                           | III                                   |   |  | 93   | 13               |                 | -63.5                 | SPT Sample                                    | er     | 14<br>17  | <del></del> 3 ⋅ | 1 -      |
| -63.9   | 19.9                      |                                       |   |  | 75   | 14               |                 | -63.9                 | SPT Sample                                    | er     | 50/0      | .4'             | F        |
|         |                           |                                       | 1. USACE Jacksonville is the custo these original files.  2. Soils are field visually classified i accordance with the Unified Soils Classification System.  3. Set 55.5 ft. of 6" flush joint steel of the tide at the Blount Island Terminal.  5. Water depth of -45.2 ft. recorded AM on 1/20/2010. Tide gage reading ft. mllw  6. Laboratory Testing Results  SAMPLE SAMPLE LABORA ID DEPTH CLASSIFIC 2 1.5/3.0 SM*  *Lab visual classification based on grouve. No Atterberg limits. | casing drilling al station at 08:08 g of +1.2  TORY CATION |      |                  |                 | 140# ha<br>2.0' split | mmer w/30" drop use<br>spoon (1-3/8" I.D. x 2 | d witr | n<br>D.). |                 |          |

| DRI    | LLING   | LOG     | DIVISION   |         |        | LATI             |                 |  | SHEET 1           | 7.7.7   |
|--------|---|---------|--|---------|--------|------------------|-----------------|--|-------------------|---------|
| . PRO. |   | -00     | South Atlantic   | _       |        |                  | /ille Di        |  | OF 2 SH           | EETS    |
|        | JECT<br>acksonville   |         | or CBB   | 1200    |        | -                |                 | SYSTEM/DATUM HORIZONTAL  | VERTICAL          |         |
| 100    | 270000000000000000000000000000000000000   |         | R CHANNEL  | 10.     | -55    | 23.00            | The same of     | ne, FLE (U.S. Ft.) NAD83   | MLLW              |         |
|        | NG DESIG  |         | NO THE RESIDENCE OF THE PROPERTY OF THE PROPER | 11.     |        | 100000           |                 |  | AUTO HAMME        | R       |
|        | B-JHPM0   |         | X = 492,489 Y = 2,202,538  |         |        | Died             | Irich D         |  | MANUAL HAM        |         |
|        | LING AGEN   |         | ering & Testing, Inc. 2009D08  | 12.     | то     | TAL              | SAMPL           | LES DISTURBED 10   | UNDISTURBED<br>0  | (UD)    |
|        | E OF DRILL  |         | ering & resuing, inc. ; 2009D00  | 13.     | то     | TAL              | NUMB            | ER CORE BOXES 1  | U                 |         |
|        | larvin Stric  |         |  | 14.     | -      | 20,500           |                 | ROUND WATER TIDAL  |                   |         |
|        | CTION OF  | BORING  | DEG. FROM BEARING VERTICAL   | T. C.L. |        |                  |                 | STARTED  | COMPLETE          | D       |
|        | NCLINED   |         |  | 15.     | DA     | TE B             | ORING           | 01-19-10   | 01-19-1           | 0       |
| THIC   | KNESS OF  | OVERB   | BURDEN N/A   | 16.     | EL     | EVAT             | ION T           | OP OF BORING -49.7 Ft.   |                   |         |
| DEPT   | TH DRILLE   | OTNIO   | ROCK N/A   | 17.     | то     | TAL              | RECOV           | /ERY FOR BORING 83 %   |                   |         |
| TOT    | AL DEPTH  | OF BOD  | ING 15.0 Ft.   | 18.     | 1000   |                  | -               | ND TITLE OF INSPECTOR  |                   |         |
| 1017   | AL DEPTH  | 1 1     | 15.0 Ft.   | 1       | -      | _                | _               | npson III, Civil Engineer  |                   |         |
| LEV.   | DEPTH   | LEGEND  | CLASSIFICATION OF MATERIALS  | R       | ές.    | BOX OR<br>SAMPLE | RQD<br>OR<br>UD | REMARKS  | BLOWS/<br>0.5 FT. | N-VALUE |
| 49.7   | 0.0   |         |  |         |        |                  |                 | -49.7  |                   |         |
|        |   | :::     | SAND, poorly-graded, mostly angular to   | - 30    |        |                  |                 |  | 6                 |         |
|        |   | 200     | subangular fine to medium-grained sand-sized quartz, little angular to   | 8       | 80     | 1                |                 | SPT Sampler  | 8                 | 1       |
|        |   |         | subangular shell up to 3/8", wet, 5Y 5/3 oliv (SP)   | e       | 'n.    |                  |                 | -51.2  | 9                 | 17      |
|        |   |         | (GF)   |         | -      |                  | 1               | -51.2  | 9                 |         |
| 52.0   | 2.3   | 2.0     |  | 1       | 00     | 2                |                 | SPT Sampler  | 11                |         |
|        |   |         | SAND, poorly-graded with silt, mostly<br>angular to subangular fine-grained  |         | 00     | -                | Ш               | 37-00000-1000  | 10                | 21      |
| 52.7   | 3.0   | 1111    | sand-sized quartz, few silt, few angular to  | /       | -      | -                |                 | -52.7  | 4                 |         |
| 4      | -   | 1+1+1   | subangular shell up to 1/8", wet, 5Y 5/1 gra   | . /     | 93     | 3                |                 | CDT Complex  | 3                 |         |
|        | -   | 11-1+1  | SAND, silty, mostly angular to subangular  |         | 93     | 3                |                 | SPT Sampler  | 7                 | 13      |
| - 1    |   | 1111    | fine-grained sand-sized quartz, some angul<br>to subangular shell up to 3/4", little silt, wet,  | ar      | -      |                  | 1               | -54.2  |                   |         |
| - 1    | -   | 11-11-1 | 5Y 4/1 dark gray (SM)  |         |        | 12               |                 |  | 8                 |         |
|        |   |         |  |         | 67     | 4                | Ш               | SPT Sampler  | 9                 | 18      |
|        |   | HH      |  | · c     | -      | _                |                 | -55.7  | 9                 |         |
|        |   |         |  |         | arted. |                  |                 | Name and Control of the Control of t | 4                 |         |
|        | 5   |         |  | - 13    | 73     | 5                | Ш               | SPT Sampler  | _ 4               | 10      |
|        |   |         |  |         |        |                  |                 | -57.2  | 6                 |         |
|        | =   | 1111    |  |         | ļ      |                  |                 | La Contract Association  | _ 9               |         |
|        |   | 111     |  | 8       | 87     | 6                |                 | SPT Sampler  | 10                | 19      |
|        | _   |         |  |         |        |                  |                 | -58.7  | 9                 | 3/2     |
|        |   | 1111    |  |         |        |                  |                 |  | 2                 |         |
| - 6    | -   | 1111    |  | 1       | 00     | 7                |                 | SPT Sampler  | 2                 | 5       |
|        |   | 11-11-  |  |         |        |                  |                 | -60.2  | 3                 | J       |
|        |   | 111     |  | 100     |        |                  | 1 I             |  | 9                 |         |
|        | -   |         |  | 7       | 73     | 8                |                 | SPT Sampler  | 8                 |         |
| 61.7   | 12.0  |         | At El61.2 Ft., strong cementation,<br>2.5Y 4/4 olive brown   |         |        |                  |                 | -61.7  | 50                | 58      |
|        |   |         | SILT, inorganic-L, medium plasticity, hard,  | 1       | 00     |                  | 1 1             |  | 23                |         |
|        | -   |         | moist, 2.5Y 4/4 olive brown (ML)   | 8       | 89     | 9                |                 | -62.6 SPT Sampler  | 50/0.4'           |         |
| 62.2   | 12.5  |         | At El62.7 Ft., very hard   | 0.5     |        |                  | 1 1             | Advanced Davis   | g                 |         |
| 63.2   | 13.5  | 11111   | SAND, silty, mostly medium to  | 72.0-   |        | -                | 1               | -63.2 Advanced Boring  | 31                |         |
|        | SAND, silty, mostly medium to coarse-grained sand-sized quartz, little si moist, 5Y 6/4 pale olive (SM) |         |  | 73      | 10     |                  | SPT Sampler     | 10   |                   |         |
|        |   | 111     | most of ort paid dive (Oil)  |         | 10     | 10               |                 |  | -                 | 24      |
| 64.7   | 15.0  |         |  |         |        |                  |                 | -64.7  | 14                |         |

| UKI   | ILLING      | LO     | G (Cont. Sheet)   | INSTALLA   |      | <b>.</b> .       |                 |                                     |              | SHEET 2           |         |
|-------|-------------|--------|---|--|------|------------------|-----------------|-------------------------------------|--------------|-------------------|---------|
| ROJEC |             |        |   | Jackso<br>COORDINA                                     |      |                  |                 | UM HORIZO                           |              | OF 2 S            | HEETS   |
|       | sonville Ha | rbor   | GRR   | State P  |      |                  |                 | 1                                   |              | MLLW              |         |
|       | ON COORDI   |        |   | ELEVATIO   |      |                  |                 |                                     |              | <u> </u>          |         |
| X = 4 | 192,489     | Y = 2  | 2,202,538   | -49.7 F  | t.   |                  |                 |                                     |              |                   |         |
| ELEV. | DEPTH       | LEGEND | CLASSIFICATION OF MATERIA   | LS   | REC. | BOX OR<br>SAMPLE | RQD<br>OR<br>UD |                                     | REMARKS      | BLOWS/<br>0.5 FT. | N-VALUE |
| ELEV. | DEPTH       | LEGEN  | NOTES:  1. USACE Jacksonville is the custo these original files.  2. Soils are field visually classified accordance with the Unified Soils Classification System.  3. Set 59.5 ft. of 6" flush joint steel  4. Water depth recorded at start of operations and referenced to the tidat the Blount Island Terminal.  5. Water depth of -51.4 ft. recorded AM on 1/19/2010. Tide gage readin ft. mllw  6. Laboratory Testing Results  SAMPLE SAMPLE LABORA ID DEPTH CLASSIFITM DEPTH CLASSIFITM 1 0.0/1.5 SP  *Lab visual classification based on curve. No Atterberg limits. | dian for casing drilling al station at 08:38 g of +1.7 | REG. | BOX 01 SAMPL     | G09             | 140# hammer w/3 2.0' split spoon (1 | 30" drop use | d with            | N-VALU  |

| DRI    | LLING              | LOG                      | DIVISION   | INSTA    | LLATI            | ON              |                    |                       | SHEET 1           | 100     |
|--------|--------------------|--------------------------|--|----------|------------------|-----------------|--------------------|-----------------------|-------------------|---------|
| . PRO  |                    | _00                      | South Atlantic   | _        | _                |                 | istrict            |                       | OF 2 SH           | EETS    |
|        |                    | 11-4                     | CDD  | 1500     | -                | 100             | E OF BIT See       | Remarks<br>HORIZONTAL | VERTICAL          |         |
| 0.5    | acksonville        |                          | R CHANNEL  | 10. 0    |                  |                 | ne, FLE (U.S. Ft.) | Percentage of         | MLLW              |         |
|        | ING DESIG          |                          | THE PART OF PARTY AND ADDRESS OF THE PARTY AND | 11. M    |                  |                 | RER'S DESIGNATION  |                       | AUTO HAMMI        | R       |
|        | B-JHPMO            | 100                      | X = 494,732 Y = 2,202,376  |          | Diec             | Irich D         | 0-50 Truckrig      | <b>⊠</b> N            | MANUAL HAN        | MER     |
|        | LING AGEN          |                          | ering & Testing, Inc. 2009D08  | 12. T    | OTAL             | SAMP            |                    | 13                    | NDISTURBED        | (UD)    |
|        | E OF DRILL         |                          | ering & resuing, inc   | 13. T    | OTAL             | NUMB            | ER CORE BOXES      | 1                     | U                 |         |
|        | Marvin Stric       |                          |  | 70.00    | 200,000          | 10.3            | ROUND WATER        | TIDAL                 |                   |         |
|        | VERTICAL           | BORIN                    | DEG. FROM BEARING VERTICAL   | Total Co |                  | nasyne.         |                    | STARTED               | COMPLETE          | D       |
|        | INCLINED           |                          |  | 15. D    | ATE B            | ORING           | 3                  | 01-15-10              | 01-15-            |         |
| . THIC | KNESS OF           | OVERE                    | BURDEN N/A   | 16. E    | LEVAT            | TION T          | OP OF BORING       | -42.4 Ft.             |                   |         |
| . DEP  | TH DRILLE          | OTNI                     | ROCK N/A   | 17. T    | OTAL             | RECO            | VERY FOR BORING    | 85 %                  |                   |         |
| TOT    | AL DEPTH           | OE DOD                   | 18.9 Ft.   | 18. S    |                  |                 | AND TITLE OF INSPE |                       |                   |         |
| . 101  | AL DEPTH           | 1 1                      | 10.9 Ft.   | 4        | _                | _               | npson III, Civil E | ngineer               | -                 | III     |
| ELEV.  | DEPTH              | LEGEND                   | CLASSIFICATION OF MATERIALS  | RÉC      | BOX OR<br>SAMPLE | RQD<br>OR<br>UD |                    | REMARKS               | BLOWS/<br>0.5 FT. | N-VALUE |
| 42.4   | 0.0                |                          |  |          |                  |                 | -42.4              |                       |                   |         |
| 72.4   | - 0.0              | 1111                     | SAND, silty, mostly angular to subangular  |          |                  |                 | 72.7               |                       | 0                 |         |
|        |                    |                          | fine-grained sand-sized quartz, little silt, we 5Y 3/2 dark olive gray (SM)  | t, 60    | 1                |                 |                    | SPT Sampler           | 7                 |         |
| 40.0   | -                  | [t]t                     | 3  |          |                  |                 | 40.0               | or i campio.          | 3                 | 10      |
| 43.9   | 1.5                | 1111                     | SAND, poorly-graded, mostly angular to   | -48      |                  |                 | -43.9              |                       | 2                 |         |
| - 1    | <u> </u>           |                          | subangular fine to medium-grained sand-sized quartz, trace angular to  | 80       | 2                |                 |                    | CDT Camples           | 0                 |         |
| - 1    | -                  |                          | subangular shell up to 1/4", wet, 5Y 6/2 ligh  |          | 2                |                 |                    | SPT Sampler           | -                 | 0       |
|        |                    |                          | olive gray (SP)  |          |                  |                 | -45.4              |                       | 0                 |         |
|        | -                  |                          |  | 2.0      |                  |                 |                    |                       | 2                 |         |
|        |                    |                          | At El46.2 Ft., 5Y 4/1 dark gray  | 87       | 3                |                 |                    | SPT Sampler           | _ 2               | 5       |
| 46.9   | 4.5                | :::                      | OLAV Is an issued at the first force and is  |          |                  |                 | -46.9              |                       | 3                 |         |
|        | -                  |                          | CLAY, lean, low plasticity, firm, few angular<br>shell up to 2", trace angular to subangular   |          |                  |                 |                    |                       | 7                 |         |
|        |                    |                          | fine-grained sand-sized quartz, moist,<br>5Y 7/2 light gray (CL)   | 80       | 4                |                 |                    | SPT Sampler           | 6                 | 13      |
| 48.4   | 6.0                |                          |  | - 4      |                  |                 | -48.4              |                       | 7                 | 10      |
|        |                    |                          | SAND, clayey, nonplastic, hard, mostly<br>fine-grained sand-sized quartz, little angula  |          |                  |                 | T                  |                       | 15                |         |
|        |                    |                          | shell up to 2", little clay, moist, 5Y 7/2 light   | 80       | 5                |                 | 1                  | SPT Sampler           | 23                |         |
| 49.9   | 7.5                |                          | gray (SC)  |          |                  |                 | -49.9              |                       | 32                | 55      |
|        |                    | III                      | LIMESTONE, sandy, sparsely fossiliferous, very soft, slightly weathered, fine grained,   |          |                  |                 |                    |                       | 8                 |         |
|        | 5                  | III<br>III<br>III<br>III | thick bedding, bedding orientation, moist,   | 80       | 6                |                 |                    | SPT Sampler           | 14                |         |
|        |                    | III                      | 2.5Y 8/2 pale yellow   |          |                  |                 | -51.4              |                       | 8                 | 22      |
|        |                    |                          |  |          |                  | 1               |                    |                       | 5                 |         |
|        | 2                  | ITI                      |  | 73       | 7                |                 | 1                  | SPT Sampler           | 10                | 36.04   |
|        |                    | ITI                      |  | 1        |                  |                 | -52.9              |                       | 7                 | 17      |
|        | ered               | III                      |  | 100      |                  |                 | 02.0               |                       | 8                 |         |
|        | Slightty Weathered | III                      |  | 87       | 8                |                 |                    | SPT Sampler           | 10                |         |
|        | - ¥                | III                      |  | 0,       | ľ                |                 | 64.4               | J. i Campioi          | 11                | 21      |
|        | - Sig              | III                      |  | 2        |                  |                 | -54.4              |                       | 11                |         |
|        |                    | İİİ                      |  | 100      | 9                |                 |                    | CDT Complet           | _                 |         |
|        |                    | III<br>III               |  | 100      | 9                |                 | Else               | SPT Sampler           | 12                | 21      |
|        | 20                 | ITI                      | Î  | 0        |                  |                 | -55.9              |                       | 9                 |         |
|        |                    | III                      |  |          | ( ) also         |                 |                    | Name in the last      | 8                 |         |
|        |                    | III<br>III<br>III        |  | 100      | 10               |                 |                    | SPT Sampler           | 10                | 17      |
|        | 2                  | ITI                      |  |          |                  |                 | -57.4              |                       | 7                 |         |

| DRI    | INSTALLATION SHEET 2 Jacksonville District OF 2 SHEETS |                   |   |  |      |                  |                 |                       |   |                |           |                   |          |            |
|--------|--|-------------------|---|--|------|------------------|-----------------|-----------------------|---|----------------|-----------|-------------------|----------|------------|
| PROJEC | т  |                   |   | COORDINA   |      |                  |                 | UM                    | HORIZONTAL                                    | VF             | RTICA     |                   |          | Ť          |
|        | sonville Ha  | arbor (           | RR  | State F  |      |                  |                 |                       | NAD83   | 1              | MLLV      |                   |          |            |
|        | ON COORD   |                   |   | ELEVATIO   |      |                  |                 |                       |   |                |           | •                 |          | ┪.         |
|        | 194,732  |                   |   | -42.4 F  |      | ٠                |                 | _                     |   |                |           |                   |          |            |
| ELEV.  | DEPTH  | LEGEND            | CLASSIFICATION OF MATERIA   |  | REC. | BOX OR<br>SAMPLE | RQD<br>OR<br>UD |                       | REMARKS                                       |                |           | BLOWS/<br>0.5 FT. | N-VALUE  |            |
|        |  | III<br>III<br>III |   |  | 100  | 11               |                 |                       | SPT Sample                                    | er             | _         | 6<br>21           | 5:       | -          |
| -58.9  | 16.5   | , III             | SAND, poorly-graded, mostly angula subangular fine to medium-grained  | ar to  |      |                  |                 | -58.9                 |   |                |           | 32<br>9           |          | 1          |
|        |  |                   | sand-sized quartz, trace angular she<br>1/8", trace subrounded phosphate u<br>moist, 5Y 8/1 white (SP)  |  | 93   | 12               |                 | -60.3                 | SPT Sample                                    |                |           | 31<br>0/0.        | 81<br>4' | + -        |
| -61.3  | 18.9   | NOTES:            |   |  | 89   | 13               |                 | -60.4<br>-61.3        | Advanced Bo<br>SPT Sampl                      |                | 5         | 18<br>60/0.       | _        | <u>-</u> F |
|        |  |                   | NOTES:  1. USACE Jacksonville is the custo  | idian for  |      |                  |                 | 140# ha<br>2.0' split | mmer w/30" drop use<br>spoon (1-3/8" I.D. x 2 | d wit<br>2" O. | h<br>D.). |                   |          | E          |
|        |  |                   | 1. USACE Jacksonville is the custo these original files.  2. Soils are field visually classified accordance with the Unified Soils Classification System.  3. Set 54.5 ft. of 6" flush joint steel  4. Water depth recorded at start of operations and referenced to the tid at the Blount Island Terminal.  5. Water depth of -45.6 ft. recorded AM on 1/15/2010. Tide gage reading ft. mllw  6. Additional lab test results were a February 2011  7. Laboratory Testing Results  SAMPLE SAMPLE LABORA ID DEPTH CLASSIFIC SAMPLE SAMPLE SAMPLE SAMPLE SAMPLE SAMPLE LABORA ID DEPTH CLASSIFIC SAMPLE SAMPLE SAMPLE SAMPLE SAMPLE SAMPLE LABORA ID DEPTH CLASSIFIC SAMPLE SAMPLE SAMPLE SAMPLE LABORA ID DEPTH CLASSIFIC SAMPLE SAMPLE SAMPLE LABORA ID DEPTH CLASSIFIC SAMPLE SAMPLE SAMPLE LABORA ID DEPTH CLASSIFIC SAMPLE S | casing drilling al station l at 08:14 g of +3.2 dded TORY CATION |      |                  |                 |                       |   |                |           |                   |          |            |
|        |  |                   |   |  |      |                  |                 |                       |   |                |           |                   |          |            |

| DDI   | LLING        | LOG      | DIVISION   | INSTA    | LLATI   | ON              |  | SHEET 1           |         |
|-------|--------------|----------|--|----------|---------|-----------------|--|-------------------|---------|
| . PRO | -97924       | 200      | South Atlantic   | -        |         | ville D         |  | OF 3 SH           | IEETS   |
|       |              | . 11-4   |  | 1500     |         | 200             | See Remarks SYSTEM/DATUM HORIZONTAL  | VERTICAL          |         |
| 100   | acksonville  | 1000     | or GRR<br>R CHANNEL  | 10. 0    |         |                 | ne, FLE (U.S. Ft.) NAD83   | MLLW              |         |
|       | ING DESIG    |          | THE PART OF A STATE OF THE PART OF THE PAR | 11. N    |         |                 |  | AUTO HAMME        | R       |
| -     | B-JHPM0      | 1000     | X = 497,199 Y = 2,203,050  |          | Die     | drich D         | 0-50 Truckrig  | MANUAL HAN        | IMER    |
|       | LING AGE     |          | CONTRACTOR FILE NO.  |          | OTAL    | SAMPI           | FS   | UNDISTURBED       | (UD)    |
|       | hallenge E   |          | ering & Testing, Inc.   2009D08  | 102      |         |                 | 21   | 0                 |         |
|       | Marvin Stric |          |  | 26.25.75 | 200,00  | 10.5            | ER CORE BOXES 1  |                   |         |
| -     | CTION OF     | BORIN    | G DEG. FROM BEARING<br>VERTICAL  | 14. E    | LEVA'   | TION G          | ROUND WATER TIDAL  |                   |         |
|       | VERTICAL     |          |  | 15. D    | ATE B   | ORING           | STARTED 01-14-10   | 01-14-1           |         |
| THIC  | KNESS OF     | OVER     | BURDEN N/A   | 16. E    | LEVA'   | TION T          | OP OF BORING -31.1 Ft.   |                   |         |
| DEP   | TH DRILLE    | INTO     | ROCK N/A   | 17. T    | OTAL    | RECO            | VERY FOR BORING 80 %   |                   |         |
|       | 7 200 500    | A 32 343 | ALCOHOL DESCRIPTION OF THE PROPERTY OF THE PRO | 18. S    | IGNA    | TURE A          | AND TITLE OF INSPECTOR   |                   |         |
| TOT   | AL DEPTH     | OF BOR   | 31.5 Ft.   |          | -       | _               | npson III, Civil Engineer  |                   |         |
| LEV.  | DEPTH        | LEGEND   | CLASSIFICATION OF MATERIALS  | RÉC      | BOX OR  | ROD<br>OR<br>UD | REMARKS  | BLOWS/<br>0.5 FT. | N-VALUE |
| 31.1  | 0.0          |          |  | 7        |         |                 | -31.1  |                   |         |
| ***   |              | 1111     | SAND, silty, mostly angular to subangular  |          |         |                 |  | 1                 |         |
|       | <u> </u>     | [[]      | fine to medium-grained sand-sized quartz,<br>little silt, few angular to subangular shell up   | 60       | 1       |                 | SPT Sampler  | 3                 |         |
|       |              | [[t]t    | to 1-1/2", wet, 5Y 5/2 olive gray (SM)   |          |         | Ш               | 1000   | 2                 | 5       |
| 32.6  | 1.5          | 1111     | SAND, poorly-graded, mostly angular to   | -98      | -       | 4               | -32.6  |                   |         |
| - 1   | <u> </u>     |          | subangular medium to coarse-grained  |          |         |                 | 200  | 3                 | -       |
|       | -            |          | sand-sized quartz, little angular shell up to 1/8", wet, 5Y 5/3 olive (SP)   | 73       | 2       | 1               | SPT Sampler  | -                 | 2       |
| 34.1  | 3.0          | 1000     | The state of the s |          |         |                 | -34.1  | 1                 |         |
|       | 2            |          | SAND, silty, mostly angular to subangular<br>fine to medium-grained sand-sized quartz,   |          |         |                 |  | 4                 |         |
|       | 8            |          | little silt, trace angular to subangular shell u   | p 53     | 3       | 1               | SPT Sampler  | 5                 | 12      |
|       | -            | 11111    | to 1/4", wet, strongly cemented 2" nodule, 5Y 5/2 olive gray (SM)  |          |         |                 | -35.6  | 7                 | 12      |
|       | 2            | HH       | Salar Carrier and Salar Salar Salar Salar Salar Salar Salar Salar Salar Salar Salar Salar Salar Salar Salar Sa   |          |         |                 |  | 5                 |         |
|       | =            | 1111     |  | 60       | 4       |                 | SPT Sampler  | 6                 |         |
|       |              | II:II    |  | 100      | m       | Ш               | -37.1  | 3                 | 9       |
|       |              | 11.11    | At El37.1 Ft., little angular shell up to 3/8"   | 1        |         | 1 1             | -57.1  | 1                 |         |
|       | -            | Itt      |  | 67       | 5       | ы               | SPT Sampler  | . 2               | 1       |
|       |              |          |  | 0,       | , ·     |                 |  | 2                 | 4       |
| 38.6  | 7.5          | 1111     | SAND, poorly-graded with silt, mostly  | - 200    |         | -               | -38.6  |                   |         |
|       |              |          | angular to subangular coarse-grained   |          |         | 1               | 200  | 2                 |         |
|       | -            |          | sand-sized quartz, little angular shell up to 3/8", few silt, wet, 5Y 4/2 olive gray (SP-SN  | 67       | 6       |                 | SPT Sampler  | -                 | 6       |
| 10.1  | 9.0          |          | At El39.6 Ft., trace angular shell up to 1/8   |          |         |                 | -40.1  | 3                 | - "     |
|       |              | 1+1+1    | SAND, silty, mostly angular to subangular<br>fine to medium-grained sand-sized quartz,   |          |         |                 | and the second   | _ 2               |         |
|       | <u>≥</u>     | 11       | little silt, trace angular to subangular shell u   | p 67     | 7       | 1               | SPT Sampler  | 1                 | 3       |
|       |              | 1111     | to 1/8", wet, 5Y 4/2 olive gray (SM)   |          |         |                 | -41.6  | 2                 | 9       |
|       | 2            |          | At El41.6 Ft., 5Y 3/2 dark olive gray  | 7        |         |                 |  | 2                 |         |
|       | -            |          |  | 80       | 8       |                 | SPT Sampler  | 4                 | 364     |
| 3.1   | 12.0         | H        |  |          |         |                 | -43.1  | 4                 | 8       |
| 10.1  | 12.0         |          | SAND, poorly-graded, mostly angular to   |          |         | 1               | 70.1   | 3                 |         |
|       |              |          | subangular fine to medium-grained<br>sand-sized quartz, trace angular shell up to  | 60       | 9       |                 | SPT Sampler  | -                 |         |
|       |              |          | 1/8", wet, 5Y 5/1 gray (SP)  | 00       | 3       |                 | The state of the s | 7                 | 12      |
| 14.6  | 13.5         | tit      | LIMESTONE, sandy, sparsely fossiliferous,  | -        | -       | 4               | -44.6  | 7.9               |         |
|       | SI Weathered |          | soft, slightly weathered, fine grained, thick  |          | a plant | 1 1             |  | 10                |         |
|       | - %          | ITI      | bedding, bedding orientation, moist,<br>5Y 5/1 gray  | 13       | 10      |                 | SPT Sampler  | 3-                | 13      |
| - 1   | - v          | III      |  | 7.1      |         |                 | -46.1  | 7                 |         |

| DRI    | ILLING             | G (Cont. Sheet) | INSTALLA<br>Jackso   |                  | Distr        | ict              |                 |                      |  | SHEET 2          |                   | ֡֟֝֟֝֟֝֟֝֟֝֟֝ <del>֚</del> |   |
|--------|--------------------|-----------------|--|------------------|--------------|------------------|-----------------|----------------------|--|------------------|-------------------|----------------------------|---|
| PROJEC | :T                 |                 |  | COORDINA         |              |                  |                 | UM                   | HORIZONTAL                                       | VER              | TICAL             |                            | 1 |
|        | sonville Ha        | rbor (          | GRR  | State F          |              |                  |                 |                      | NAD83  | 1                | /LLW              |                            |   |
|        | ON COORDII         |                 |  | ELEVATIO         |              |                  |                 |                      | •  | •                |                   |                            | 1 |
| X = 4  | 497,199            | Y = 2           | ,203,050   | -31.1 F          | ⁼t.          |                  |                 |                      |  |                  |                   |                            |   |
| ELEV.  | DEPTH              | LEGEND          | CLASSIFICATION OF MATERIA  | ALS              | REC.         | BOX OR<br>SAMPLE | RQD<br>OR<br>UD |                      | REMARKS  |                  | BLOWS/<br>0.5 FT. | N-VALUE                    |   |
|        | ered               | III<br>III      | At El46.1 Ft., moderately hard   |                  | 100          | 11               |                 | -46.5                | SPT Sample                                       | er               | 50/0.4            | ļ'                         | F |
| -47.6  | 5.91 SI. Weathered |                 |  |                  |              |                  |                 | -47.6                | Advanced Bo                                      | ring             |                   |                            | - |
| 47.0   | 10.0 0             |                 | SAND, poorly-graded with silt, mos   | tly              | <del> </del> |                  | •               | -47.0                |  |                  | 40                |                            | ‡ |
|        |                    |                 | angular to subangular fine to<br>medium-grained sand-sized quartz                            | . few            | 100          | 12               |                 |                      | SPT Sample                                       | er               | 41                | 7                          | F |
| 40.4   | 40.0               | <b> </b> :-     | subrounded limestone up to 1", mo  | ist,             |              | '-               |                 | 40.4                 | 5 Gamp.  |                  | 42                | 83                         | Ŀ |
| -49.1  | 18.0               |                 | 5Y 6/2 light olive gray (SP-SM) SAND, silty, mostly angular to suba                          | angular          | +-           |                  | 1               | -49.1                |  |                  | 12                |                            | ŧ |
|        |                    | <b> </b>        | fine to medium-grained sand-sized  | quartz,          | 1,00         | 40               |                 |                      | ODT 0  |                  |                   | -                          | F |
|        |                    | <b>Ĭ</b> †↓†↓   | little silt, trace subangular phospha 1/8", moist, 5Y 6/2 light olive gray                   | te up to<br>(SM) | 100          | 13               |                 |                      | SPT Sample                                       | er               | 9                 | 20                         | F |
|        |                    | ĬĬĬĬ            | 3  | (- )             |              |                  |                 | -50.6                |  |                  | 11                |                            | 丰 |
|        |                    | ĬţĬţĬ           |  |                  |              |                  |                 |                      |  |                  | 11                | _                          | Ė |
|        |                    | <b> </b>        |  |                  | 100          | 14               |                 |                      | SPT Sample                                       | er               | 12                | 24                         | t |
|        |                    | ĬţŢŢŢ           |  |                  |              |                  |                 | -52.1                |  |                  | 12                |                            | Ŀ |
|        |                    | ĬĬŧĬţ           |  |                  |              |                  |                 |                      |  |                  | 7                 |                            | ŀ |
|        |                    | Ĭ÷Ĭ÷Ĭ           |  |                  | 100          | 15               |                 |                      | SPT Sample                                       | er               | 10                | 0.5                        | F |
|        |                    | ĬĬŀĬŀ           |  |                  |              |                  |                 | -53.6                |  |                  | 15                | 25                         | F |
|        |                    | <b> </b>        | At El53.6 Ft., 5Y 5/2 olive gray   |                  |              |                  | 1               | 00.0                 |  |                  | 9                 |                            | ŧ |
|        |                    |                 |  |                  | 100          | 16               |                 |                      | SPT Sample                                       | er               | 12                | _                          | F |
|        |                    | <b>│</b> ┼┆┼┆   |  |                  |              |                  |                 | 55.4                 | 5 Gamp.  |                  | 14                | 26                         | Ŀ |
|        |                    | ĬĬŀĬŀ           |  |                  |              |                  | 1               | -55.1                |  |                  | 3                 |                            | t |
|        |                    | <b>Ĭ</b> ┼┆┼┆   |  |                  | 100          | 17               |                 |                      | SPT Sample                                       | or               | <del></del>       | $\dashv$                   | Ŀ |
|        |                    | <b> </b>        |  |                  | 1100         | ''               |                 |                      | 3FT Sampi  | <b>5</b> 1       |                   | 14                         | F |
|        |                    | Ĭ÷Ĭ÷Ĭ           |  |                  |              |                  | -               | -56.6                |  |                  | 9                 |                            | Ŧ |
|        |                    | ĬĬŀĬŀ           |  |                  |              |                  |                 |                      |  |                  | 8                 | 4                          | Ė |
|        |                    | <b>│</b> ∤┆∤┆   |  |                  | 100          | 18               |                 |                      | SPT Sample                                       | er               | 8                 | 23                         | þ |
|        |                    |                 |  |                  |              |                  |                 | -58.1                |  |                  | 15                |                            | ŧ |
|        |                    | [+]+[           |  |                  |              |                  |                 |                      |  |                  | 5                 |                            | Ŀ |
|        |                    | ĬĬŀĬŀ           |  |                  | 100          | 19               |                 |                      | SPT Sample                                       | er               | 6                 | 15                         | Ŀ |
|        |                    | <b> </b>        |  |                  |              |                  |                 | -59.6                |  |                  | 9                 | 13                         | ŀ |
|        |                    |                 |  |                  |              |                  |                 |                      |  |                  | 7                 |                            | Ŧ |
|        |                    | <b>│</b> ┼┆┼┆   |  |                  | 100          | 20               |                 |                      | SPT Sample                                       | er               | 8                 | ٦.,                        | F |
|        |                    |                 |  |                  |              |                  |                 | -61.1                |  |                  | 12                | 20                         | F |
|        |                    | <b> </b>        |  |                  |              |                  | 1               |                      |  |                  | 3                 |                            | ŧ |
|        |                    |                 |  |                  | 93           | 21               |                 |                      | SPT Sample                                       | er               | 6                 | 7                          | ţ |
| -62.6  | 31.5               |                 |  |                  |              |                  |                 | _62 E                | <b>'F</b> -                                      |                  | 10                | 16                         | þ |
| -0∠.0  | 31.5               |                 |  |                  | +            |                  |                 | -62.6                | /00" ·   | ,                |                   | +                          | ŧ |
|        |                    |                 | NOTES:  1. USACE Jacksonville is the cust these original files.                              | odian for        |              |                  |                 | 140# ha<br>2.0' spli | ammer w/30" drop use<br>t spoon (1-3/8" I.D. x 2 | d with<br>2" O.E | n<br>D.).         |                            | - |
|        |                    |                 | Soils are field visually classified accordance with the Unified Soils Classification System. | in               |              |                  |                 |                      |  |                  |                   |                            |   |
|        |                    |                 | 3. Set 42.5 ft. of 6" flush joint steel  | casing           | 1            |                  |                 |                      |  |                  |                   |                            | t |

| DRILLING LO        | OG (Cont. Sheet)  | INSTALLA<br>Jackso                            |       | Dietr            | ict             |            | SHEET<br>OF 3     |         |
|--------------------|---|---|-------|------------------|-----------------|------------|-------------------|---------|
| ROJECT             | •   | COORDINA                                      |       |                  |                 | HORIZONTAL | VERTICAL          |         |
| Jacksonville Harbo | or GRR  | 1   |       |                  | (U.S. Ft.)      | NAD83      | MLLW              |         |
| OCATION COORDINA   | TES   | ELEVATIO                                      | N TOP | OF B             | ORING           |            |                   |         |
| X = 497,199 Y =    | = 2,203,050   | -31.1 F                                       | t.    |                  |                 |            |                   |         |
| ELEV. DEPTH        | CLASSIFICATION OF MATERI  | IALS  | REC.  | BOX OR<br>SAMPLE | RQD<br>OR<br>UD | REMARK     | BLOWS/<br>0.5 FT. | N-VALUE |
|                    | 4. Water depth recorded at start of operations and referenced to the tratite at the Blount Island Terminal.  5. Water depth of -34.6 ft. recorded AM on 1/14/2010. Tide gage readift. mllw  6. Additional lab test results were February 2011  7. Laboratory Testing Results  SAMPLE SAMPLE LABOR ID DEPTH CLASSIF——————————————————————————————————— | ed at 08:50 ng of +3.5 added  RATORY FICATION |       |                  |                 |            |                   |         |

| DRII | LING                                 | LOG   | DIVISION   |              | LLATI     |             |   | SHEET 1           | 7.00    |
|------|--------------------------------------|---|--|--------------|-----------|-------------|---|-------------------|---------|
| PROJ |                                      | _00   | South Atlantic   | _            | _         | ville D     |   | OF 2 SH           | EETS    |
|      | cksonville                           | LI-4  | CRR  | 150          |           | 200         | E OF BIT See Remarks SYSTEM/DATUM HORIZONTAL            | VERTICAL          |         |
| 0.50 |                                      | 100   | R CHANNEL  | 10. 0        |           |             | ne, FLE (U.S. Ft.) NAD83                                | MLLW              |         |
|      | NG DESIGI                            |   | The second secon | 11. N        |           |             | RER'S DESIGNATION OF DRILL                              |                   | R       |
| CI   | B-JHPM09                             | 9-16  | X = 498,983 Y = 2,202,272  | 1000         | Died      | drich E     | 0-50 Truckrig   |                   |         |
|      | LING AGEN                            |   | contractor file no.<br>ering & Testing, Inc. 2009D08   | 12. 1        | OTAL      | SAMP        | LES DISTURBED   | UNDISTURBED<br>0  | (UD)    |
| NAMI | of DRILL                             | ER  |  | 13. 1        | OTAL      | NUMB        | ER CORE BOXES 0   |                   |         |
|      | CTION OF                             |   | DEG. FROM BEARING  | 14. E        | LEVA      | TION G      | ROUND WATER TIDAL                                       |                   |         |
|      | ERTICAL                              |   | VERTICAL   | 15. [        | ATE B     | ORING       | STARTED 01-18-10  | 01-18-1           |         |
| THIC | KNESS OF                             | OVERB   | BURDEN N/A   | 16. E        | LEVA      | TION T      | OP OF BORING -42.9 Ft.                                  |                   |         |
| DEPT | H DRILLE                             | INTO  | ROCK N/A   |              | 200       | 100 500     | VERY FOR BORING 89 %                                    |                   |         |
| TOTA | L DEPTH C                            | F BOR   | ing 21.4 Ft.   | 18. 5        |           |             | npson III, Civil Engineer                               |                   |         |
| EV.  | DEPTH                                | LEGEND  | CLASSIFICATION OF MATERIALS  | RÉG          | 84        | _           | REMARKS   | BLOWS/<br>0.5 FT. | N-VALUE |
| 2.9  | 0.0                                  |   |  |              |           |             | -42.9   |                   | 2       |
| 6.3  | 0.0                                  |   | SAND, poorly-graded, mostly angular to   | - 20         | +         |             | -42.3   | 4                 |         |
| F    |                                      |   | subangular fine to medium-grained<br>sand-sized quartz, few angular to subangular  | ar 80        | 4         |             | CDT Carrelan  |                   |         |
| F    |                                      |   | shell up to 1/8", wet, 5Y 6/2 light olive gray   | 00           | 1         |             | SPT Sampler   | -                 | 27      |
| 4.4  | 1.5                                  | 111   | (SP)   |              | -         | 4           | -44.4   | 15                |         |
|      |                                      | SAND, poorly-graded with silt, mostly angular to subangular fine to | 10   | 2            |           | COT Camala  | 9   |                   |         |
| 5.4  | 2.5                                  |   | medium-grained sand-sized quartz, little   | 10           | 2         |             | SPT Sampler   | 44                | 94+     |
| -    | <b>A</b>                             | ili<br>Tii  | angular shell up to 1/4", wet, 5Y 6/2 light olive gray (SP-SM)   |              |           |             | -45.6<br>-45.9 Advanced Borin                           | 50/0.2'           |         |
|      |                                      | III<br>III<br>III   | At El44.9 Ft., 5Y 5/1 gray   | 1            | 5         |             | #1  | 10                |         |
| Ė    |                                      | ITI   | LIMESTONE, sandy, fossiliferous,<br>moderately hard, slightly weathered, fine  | 40           | 3         |             | SPT Sampler<br>-46.9                                    | 50                |         |
|      | Serity Weathered                     | COLD TO SERVICE   | grained, thick bedding, bedding orientation, moist, 2.5Y 7/3 pale yellow  At El49.3 Ft., non-fossiliferous, soft, slightly weathered, solid  |              | RUN<br>#1 | VRQD<br>42  | 4 x 5-1/2" Diamond Impro<br>DT = 9 mins<br>HP = 300 psi | × 10-04000        |         |
| 2.3  | 9.4 Vesthere                         |   | SAND, silty, mostly angular to subangular  |              |           |             | DFR = 10 %  |                   |         |
| - 0  |                                      | 1111  | fine to medium-grained sand-sized quartz,  | The state of |           | 1 1 1       | 20.7783   | _ 3               |         |
| -    |                                      | 1111  | little silt, trace subrounded phosphate up to 1/8", moist, 5Y 7/2 light gray (SM)  | 10           | 0 4       |             | SPT Sampler   | 3                 | 8       |
|      |                                      | 1+1+  | TO THOOSE OF THE HIGH GIBY (OW)  |              |           | 2           | -53.8   | 5                 |         |
|      | At El53.9 Ft., discontinue phosphate |   |  |              |           | 12          |   |                   |         |
| E    |                                      |   | 10   | 5            |           | SPT Sampler | 18  | 24                |         |
| F    | -                                    | 1111  |  | 1            | 100       |             | 72.0  | 28                | 46      |
| F    |                                      |   | 4  | +            |           | -55.3       | 4   |                   |         |
| -    | -                                    |   | -  | _            |           | ODT 0       | -   | 1                 |         |
|      |                                      |   | 87   | 6            |           | SPT Sampler | -   | 7                 |         |
|      |                                      |   |  |              | Ш.        |             | -56.8   | 3                 | 197     |
|      |                                      |   |  |              | - 2       |             |   |                   |         |
|      | 7                                    |   |  | 93           | 7         |             | SPT Sampler   | 5                 |         |

| DRI    | LLING       | INSTALLA* Jackso |  |  |       | <u> </u>         | Hallott CD-5111 IV |                          | SHEET<br>OF 2  |       |                   |         |
|--------|-------------|------------------|--|--|-------|------------------|--------------------|--------------------------|--|-------|-------------------|---------|
| PROJEC |             |                  |  | COORDINA   |       |                  |                    | UM                       | HORIZONTAL   | VERT  |                   |         |
|        | sonville Ha | arbor (          | GRR  | State P  |       |                  |                    |                          | NAD83  | 1     | LLW               |         |
| LOCATI | ON COORD    | INATE            | s  | ELEVATIO   | н тор | OF B             | ORIN               | G                        |  |       |                   |         |
| X = 4  | 198,983     | Y = 2            | ,202,272   | -42.9 F  | t.    |                  |                    |                          |  |       |                   |         |
| ELEV.  | DEPTH       | LEGEND           | CLASSIFICATION OF MATERIA  | LS   | ĸč.   | BOX OR<br>SAMPLE | RQD<br>OR<br>UD    |                          | REMARKS  |       | BLOWS/<br>0.5 FT. | N-VALUE |
|        |             | 1111             |  |  | 93    | 7                |                    | -58.3                    | SPT Sample   | er    | 10                | 17      |
|        |             |                  |  |  |       |                  |                    |                          |  |       | 4                 |         |
|        |             | [+]              |  |  | 100   | 8                |                    |                          | SPT Sample   | er    | 4                 | 25      |
|        |             |                  |  |  |       |                  |                    | -59.8                    |  |       | 21                | 725     |
|        |             | <b> </b>         | At El59.9 Ft., 5Y 5/2 olive gray   |  |       |                  |                    |                          |  |       | 10                |         |
|        |             | <b> </b>         |  |  | 100   | 9                |                    |                          | SPT Sample   | er    | 10                |         |
|        |             | <b> </b>         |  |  |       |                  |                    | -61.3                    |  |       | 17                | 27      |
|        |             |                  |  |  |       |                  |                    |                          |  |       | 6                 |         |
|        |             |                  |  |  | 93    | 10               |                    |                          | SPT Sample   | er    | 7                 |         |
|        |             |                  |  |  |       |                  |                    | -62.8                    |  |       | 10                | 17      |
|        |             |                  |  |  |       |                  |                    | 02.0                     |  |       | 5                 |         |
|        | 21.4        |                  |  |  | 87    | 11               |                    |                          | SPT Sample   | er    | 12                |         |
| -64.3  |             |                  |  |  |       |                  |                    | -64.3                    | •  |       | 20                | 32      |
|        |             |                  | 1. USACE Jacksonville is the custof these original files.  2. Soils are field visually classified accordance with the Unified Soils Classification System.  3. Set 54.5 ft. of 4" flush joint steel  4. Water depth recorded at start of operations and referenced to the tidat the Blount Island Terminal.  5. Water depth of -45.1 ft. recorded AM on 1/18/2010. Tide gage readin ft. mllw  6. Compressive Strength Test of R At Elevation -48.4" to -49.1" = 1201 | casing drilling al station I at 08:21 g of +2.2 ock Core |       |                  |                    | Abbrevia<br>DT =<br>HP = | spoon (1-3/8" I.D. x 2<br>ations:<br>Drill Time.<br>Hydraulic Pressure.<br>= Drill Fluid Return. | . O.D | .).               |         |
|        |             |                  | 7. Compressive Strength Test of R At Elevation -49.7' to -50.1' = 135 P  8. Laboratory Testing Results  SAMPLE SAMPLE LABORA ID DEPTH CLASSIFI  2 1.5/2.7 SP-S  *Lab visual classification based on scurve. No Atterberg limits.   | SI.<br>TORY<br>CATION<br><br>M*                          |       |                  |                    |                          |  |       |                   |         |

| DRI    | LLING                | 100                              | DIVISION  |   |      | LATIC                           |           |  | SHEET 1          |                             |   |    |  |                                   |  |  |  |                  |                 |         |                   |         |
|--------|----------------------|----------------------------------|---|---|------|---------------------------------|-----------|--|------------------|-----------------------------|---|----|--|-----------------------------------|--|--|--|------------------|-----------------|---------|-------------------|---------|
| . PRO  |                      | -00                              | South Atlantic  | _   |      |                                 | /ille D   |  | OF 2 SH          | EETS                        |   |    |  |                                   |  |  |  |                  |                 |         |                   |         |
|        |                      |                                  | or CDD  | 1532  |      | 100                             |           | SYSTEM/DATUM HORIZONTAL  | VERTICAL         |                             |   |    |  |                                   |  |  |  |                  |                 |         |                   |         |
| 100    | acksonville          |                                  | OF GRR<br>ER CHANNEL  | 10.   | 100  | 23.00                           | The same  | ne, FLE (U.S. Ft.) NAD83   | MLLW             |                             |   |    |  |                                   |  |  |  |                  |                 |         |                   |         |
|        | ING DESIG            |                                  |   | 11.   |      |                                 |           | NAME AND ADDRESS OF THE OWNER, WHEN PERSON O | AUTO HAMME       | R                           |   |    |  |                                   |  |  |  |                  |                 |         |                   |         |
|        | B-JHPM0              |                                  | X = 500,552 Y = 2,201,768   |   |      | Died                            | Irich D   | 0-50 Truckrig  | MANUAL HAN       | MER                         |   |    |  |                                   |  |  |  |                  |                 |         |                   |         |
|        | LING AGEN            |                                  | ering & Testing, Inc. 2009D08   | 12.   | TO   | TAL                             | SAMPI     | LES DISTURBED  | UNDISTURBED<br>0 | (UD)                        |   |    |  |                                   |  |  |  |                  |                 |         |                   |         |
| . NAM  | E OF DRILL           | LER                              | oring a robang, mo.   | 13.   | TO   | TAL                             | NUMB      | ER CORE BOXES 0  |                  |                             |   |    |  |                                   |  |  |  |                  |                 |         |                   |         |
|        | Marvin Strice        |                                  | G DEG. FROM BEARING   | 14.   | ELE  | EVAT                            | ION G     | ROUND WATER TIDAL  |                  |                             |   |    |  |                                   |  |  |  |                  |                 |         |                   |         |
| X      | VERTICAL<br>INCLINED | BOKIN                            | G DEG. FROM BEARING VERTICAL  | 15.   | DA   | TE B                            | ORING     | STARTED 01-18-10   | 01-18-1          |                             |   |    |  |                                   |  |  |  |                  |                 |         |                   |         |
| . THIC | KNESS OF             | OVER                             | BURDEN N/A  | 16.   | ELI  | EVAT                            | ION T     | OP OF BORING -44.4 Ft.   |                  |                             |   |    |  |                                   |  |  |  |                  |                 |         |                   |         |
| . DEP  | TH DRILLE            | D INTO                           | ROCK N/A  | 17.   | 0.00 | 15.75                           | 100 5 60  | VERY FOR BORING 82 %   |                  |                             |   |    |  |                                   |  |  |  |                  |                 |         |                   |         |
| тот    | AL DEPTH             | OF BOR                           | RING 21.5 Ft.   | SIGNATURE AND TITLE OF INSPECTOR     V. J. Thompson I I I, Civil Engineer |      |                                 |           |  |                  |                             |   |    |  |                                   |  |  |  |                  |                 |         |                   |         |
|        | 35.6 8 6 7 6 7 7     | 1 1                              |   | -   | 7    | _                               | _         | npsoir i i i, Civii Engineer   | · ·              | ш                           |   |    |  |                                   |  |  |  |                  |                 |         |                   |         |
| ELEV.  | DEPTH                | EPTH CLASSIFICATION OF MATERIALS |   |   |      | PTH CLASSIFICATION OF MATERIALS |           |  |                  | CLASSIFICATION OF MATERIALS |   |    |  | DEPTH CLASSIFICATION OF MATERIALS |  |  |  | BOX OR<br>SAMPLE | RQD<br>OR<br>UD | REMARKS | BLOWS/<br>0.5 FT. | N-VALUE |
| 44.4   | 0.0                  |                                  |   |   |      |                                 |           | -44.4  |                  |                             |   |    |  |                                   |  |  |  |                  |                 |         |                   |         |
|        |                      | • • • •                          | SAND, poorly-graded, mostly angular to<br>subangular medium to coarse-grained |   |      |                                 |           |  | 4                |                             |   |    |  |                                   |  |  |  |                  |                 |         |                   |         |
|        |                      | 200                              | sand-sized quartz, few angular to subangu                                     |   | 67   | 1                               |           | SPT Sampler  | 2                |                             |   |    |  |                                   |  |  |  |                  |                 |         |                   |         |
| -45.9  | 1.5                  |                                  |   |   |      |                                 |           | -45.9  | 4                | 6                           |   |    |  |                                   |  |  |  |                  |                 |         |                   |         |
| -40.5  | A                    | III<br>III<br>III                | ,   | 7   |      | 6                               | -40.9     |  |                  |                             |   |    |  |                                   |  |  |  |                  |                 |         |                   |         |
| -50.4  | Silonty Weathered    |                                  | SAND, silty, mostly angular to subangular                                     | 6   |      | RUN<br>#1                       | RQD<br>26 | 4 x 5-1/2" Diamond Impro<br>DT = 3 mins<br>HP = 300 psi<br>DFR = 25 %  |                  |                             |   |    |  |                                   |  |  |  |                  |                 |         |                   |         |
|        | -                    | 11-11-                           | fine-grained sand-sized quartz, little silt, fer                              | w   |      |                                 |           | -50.9  | - And -          |                             |   |    |  |                                   |  |  |  |                  |                 |         |                   |         |
|        | Α,                   | 111                              | subrounded phosphate up to 1/8", moist, 5Y 6/2 light olive gray (SM)          |   |      |                                 |           |  | 8                |                             |   |    |  |                                   |  |  |  |                  |                 |         |                   |         |
|        |                      | 1-1-                             |   | 8   | 37   | 2                               |           | SPT Sampler  | 4                | 21                          |   |    |  |                                   |  |  |  |                  |                 |         |                   |         |
|        |                      | 1111                             |   |   |      |                                 |           | -52.4  | 11               | 1                           |   |    |  |                                   |  |  |  |                  |                 |         |                   |         |
| - 3    |                      | [+]+                             |   |   |      |                                 |           |  | 7                |                             |   |    |  |                                   |  |  |  |                  |                 |         |                   |         |
| - 1    |                      | 1111                             |   | 8   | 37   | 3                               |           | SPT Sampler  | 13               | 20                          |   |    |  |                                   |  |  |  |                  |                 |         |                   |         |
|        |                      | 111                              |   |   |      |                                 |           | -53.9  | 17               | 30                          |   |    |  |                                   |  |  |  |                  |                 |         |                   |         |
| 4      | 2                    | 111                              |   |   | 1    |                                 |           | 1.000  | 4                |                             |   |    |  |                                   |  |  |  |                  |                 |         |                   |         |
|        | -                    | 1111                             |   | 8   | 30   | 4                               |           | SPT Sampler  | 5                |                             |   |    |  |                                   |  |  |  |                  |                 |         |                   |         |
|        |                      | 1                                |   |   |      |                                 |           |  | 11               | 16                          |   |    |  |                                   |  |  |  |                  |                 |         |                   |         |
| 9      |                      | 111                              |   |   | 1    |                                 |           | -55.4  | 5                |                             |   |    |  |                                   |  |  |  |                  |                 |         |                   |         |
|        |                      | +[+]                             |   |   | 00   | -                               |           | COTO   | 7                |                             |   |    |  |                                   |  |  |  |                  |                 |         |                   |         |
|        | 5                    | 111                              |   |   |      | 1                               | 00        | 5  |                  | SPT Sampler                 | - | 19 |  |                                   |  |  |  |                  |                 |         |                   |         |
|        |                      |                                  | At El56.9 Ft., discontinue phosphate  |   |      | 4                               |           |  | -56.9            | 11                          |   |    |  |                                   |  |  |  |                  |                 |         |                   |         |
|        |                      | $\{[]\}$                         |   |   |      |                                 |           |  | _ 3              |                             |   |    |  |                                   |  |  |  |                  |                 |         |                   |         |
|        |                      | <u> </u>                         |   | 1   | 00   | 6                               |           | SPT Sampler  | 4                | 10                          |   |    |  |                                   |  |  |  |                  |                 |         |                   |         |
|        |                      | 1111                             |   |   |      |                                 |           | -58.4  | 6                | 10                          |   |    |  |                                   |  |  |  |                  |                 |         |                   |         |
|        | _                    | 1-1-                             |   |   |      |                                 | 6         |  |                  |                             |   |    |  |                                   |  |  |  |                  |                 |         |                   |         |
|        | 2                    | 111                              |   | 8   | 37   | 7                               | - 1       | SPT Sampler  | 10               |                             |   |    |  |                                   |  |  |  |                  |                 |         |                   |         |
|        |                      | HILL                             |   | 44.3  | _    |                                 | 1         |  |                  | L                           |   |    |  |                                   |  |  |  |                  |                 |         |                   |         |

| DRI    | LLING       | LO        | G (Cont. Sheet)  | Jackso   |      | Dietr            | rict            |                               |   | - 1  | HEET 2<br>OF 2 SH | FFTS    |
|--------|-------------|-----------|--|--|------|------------------|-----------------|-------------------------------|---|------|-------------------|---------|
| PROJEC | т           |           |  | COORDINA   |      |                  |                 | UM                            | HORIZONTAL  | VERT |                   |         |
|        | sonville Ha | arbor (   | GRR  | State F  |      |                  |                 |                               | NAD83   | ı    | LW                |         |
| OCATIO | ON COORDI   | NATE      | s  | ELEVATIO   |      |                  |                 |                               |   | •    |                   |         |
| X = 5  | 00,552      | Y = 2     | .,201,768  | -44.4 F  | t.   |                  |                 |                               |   |      |                   |         |
| ELEV.  | DEPTH       | LEGEND    | CLASSIFICATION OF MATERIA  | ALS  | REC. | BOX OR<br>SAMPLE | RQD<br>OR<br>UD |                               | REMARKS   |      | BLOWS/<br>0.5 FT. | N-VALUE |
|        |             | 1111      |  |  | 87   | 7                |                 | -59.9                         | SPT Sample  | er   | 18                | 28      |
|        |             |           |  |  |      |                  |                 |                               |   |      | 4                 | -       |
|        |             | $[\cdot]$ |  |  | 100  | 8                |                 |                               | SPT Sample  | er   | 9                 |         |
| -61.4  | 17.0        | <b> </b>  | At El60.9 Ft., moderate cementa  | tion   |      |                  |                 | -61.4                         |   |      | 31                | 40      |
| 01.4   | 17.0        |           | SILT, inorganic-H, low plasticity, h   | ard, few   | 100  | 9                |                 | -61.8                         | SPT Sample  | er   | 50/0.4'           |         |
|        |             | l I I     | angular to subangular fine-grained<br>sand-sized quartz, moist, 5Y 6/2 lig<br>gray (MH)  | ght olive  |      |                  |                 | -62.9                         | Advanced Bor  | ing  |                   |         |
|        |             |           |  |  |      | 40               |                 |                               | CDT Commis  |      | 14                |         |
|        |             |           |  |  | 89   | 10               |                 | -63.8                         | SPT Sample  | er   | 50/0.4'           |         |
|        |             | 1 1 1     |  |  |      |                  |                 | -64.4                         | Advanced Bor  | ing  |                   |         |
|        |             |           | At El64.4 Ft., discontinue fine-gr   | ained  |      |                  |                 | •                             |   |      | 12                |         |
|        |             |           | sand-sized quartz  |  | 100  | 11               |                 |                               | SPT Sample  | er   | 14                |         |
| -65.9  | 21.5        |           |  |  |      | -65.9            |                 |                               | 18  | 32   |                   |         |
|        |             |           | NOTES:  1. USACE Jacksonville is the cust these original files.  2. Soils are field visually classified accordance with the Unified Soils Classification System.  3. Set 55.5 ft. of 6" flush joint stee 4. Water depth recorded at start of operations and referenced to the tife at Sister's Creek.  5. Water depth of -47.5 ft. recorded PM on 1/18/2010. Tide gage reading ft. mllw  6. Compressive Strength Test of Fact Elevation -46.4' to -47.1' = 414 ft.  7. Laboratory Testing Results  SAMPLE SAMPLE LABOR ID DEPTH CLASSIFT CLAS | I casing I casing I drilling I dat 12:04 Ing of +3.1 I casing I casing |      |                  |                 | 2.0' split Abbrevia DT = HP = | ammer w/30" drop used<br>t spoon (1-3/8" I.D. x 2<br>ations:<br>Drill Time.<br>Hydraulic Pressure.<br>= Drill Fluid Return. |      | ).                |         |

| DPI    | LLING                | 106                 | DIVISION   | INST |      |                        |                 |  | SHEET 1             |         |
|--------|----------------------|---------------------|--|------|------|------------------------|-----------------|--|---------------------|---------|
|        |                      | LUG                 | South Atlantic   |      |      |                        | _               | istrict  | OF 2 SH             | EETS    |
| . PRO  |                      |                     | 000  | 1325 |      | - AT 10.0              |                 | See Remarks  | Menne               |         |
| 105    | acksonville          |                     |  | 10.  |      |                        |                 | SYSTEM/DATUM HORIZONTAL  | VERTICAL            |         |
|        | T. JOHN'S            |                     | R CHANNEL LOCATION COORDINATES   | 44   |      |                        |                 | ne, FLE (U.S. Ft.) NAD83 RER'S DESIGNATION OF DRILL                  | MLLW                |         |
|        | B-JHPMO              |                     | X = 502,018 Y = 2,203,023  |      |      |                        |                 | 0-50 Truckrig  | MANUAL HAN          |         |
|        | LING AGEN            |                     | CONTRACTOR FILE N  | 0.   |      |                        |                 | DISTURBED  | UNDISTURBED         |         |
|        | hallenge E           |                     | ering & Testing, Inc. 2009D08  | 1    | 100  |                        | SAMPI           | 8  | 0                   |         |
|        | Marvin Stric         |                     |  | 13.  | TOT  | TAL I                  | NUMB            | ER CORE BOXES 2  |                     |         |
|        | CTION OF             |                     | DEG. FROM BEARING  | 14.  | ELE  | VAT                    | ION G           | ROUND WATER TIDAL  |                     |         |
| -      | VERTICAL<br>INCLINED |                     | VERTICAL   | 15.  | DAT  | TE B                   | ORING           | STARTED 01-17-10   | 01-17-1             |         |
| . THIC | KNESS OF             | OVERE               | BURDEN N/A   | 16.  |      |                        | 20000           | OP OF BORING -44.1 Ft.   |                     |         |
| . DEP  | TH DRILLE            | DINTO               | ROCK N/A   | 17.  | 1000 | 2.75                   | Sec. Sec.       | VERY FOR BORING 76 %   |                     |         |
| TOT    | AL DEPTH             | OF BOR              | ING 18.5 Ft.   | 18.  | 200  |                        | 2000            | AND TITLE OF INSPECTOR   |                     |         |
|        |                      | T T                 | 10.01  | 4    | _    |                        | Thor            | npson III, Civil Engineer  | -                   | m       |
| ELEV.  | DEPTH                | LEGEND              | CLASSIFICATION OF MATERIALS  | Ri   | έc.  | BOX OR<br>SAMPLE       | ROD<br>OR<br>UD | REMARKS  | BLOWS/<br>0.5 FT.   | N-VALUE |
| -44.1  | 0.0                  |                     |  |      |      |                        |                 | -44.1  |                     |         |
| 0      |                      |                     | SAND, poorly-graded with silt, mostly<br>angular to subangular fine to   |      |      |                        |                 |  | 6                   |         |
|        |                      |                     | medium-grained sand-sized quartz, few  |      | 1    | 1                      |                 | SPT Sampler  | 8                   | 220     |
|        | -                    |                     | angular to subangular shell up to 3/8", few  | 1    |      |                        |                 | -45.5  | 50/0.4              | 58+     |
| -45.8  | 1.7                  | ·                   | silt, wet, 5Y 2.5/1 black (SP-SM)<br>At El44.4 Ft., 5Y 5/2 olive gray  | 3    | 1    |                        |                 |  | 531011              |         |
|        | Slohtv Weathered     |                     | Borehole Encrusted In Cemented Sand/Limestone LIMESTONE, sandy, sparsely fossiliferous moderately hard, slightly weathered, fine grained, thick bedding, bedding orientatio pitted, moist, 5Y 5/2 olive gray | n.   | 00   | RUN<br># 1<br>BOX<br>1 | RQD<br>22       | 4 x 5-1/2" Diamond Impr<br>DT = 6 mins<br>HP = 300 psi<br>DFR = 25 % |                     |         |
| -51.1  | 7.0                  | <del></del>         | SAND, poorly-graded, mostly angular to subangular fine to medium-grained sand-sized quartz, moist, weak cementation 5Y 7/2 light gray (SP)  At El53.6 Ft., no cementation                                    | **   |      | RUN<br># 2<br>BOX<br>2 | RQD<br>0        | HP = 250 psi<br>DFR = 0 %  | - Same and the same |         |
|        |                      |                     |  | 0.00 | +    | -                      |                 | -55.1  | 40                  |         |
| -55.9  | 11.8                 |                     |  |      |      |                        |                 |  | 10                  |         |
| -55.9  | _ 11.8               | mi                  | SAND, silty, mostly angular to subangular  | 1    | 00   | 2                      |                 | SPT Sampler  | 21                  | 36      |
| 4      | ¥                    | 111                 | fine-grained sand-sized quartz, little silt,   |      |      |                        |                 | -56.6  | 15                  | 30      |
|        |                      | 11111               | moist, 5Y 6/2 light olive gray (SM) At El56.6 Ft., strong cementation,   |      |      | - 3                    |                 |  | 28                  |         |
|        |                      | 1+1+                | 5Y 5/2 olive gray  | 4    | 00   | 3                      |                 | SPT Sampler  | -                   |         |
| - 0    | 2                    | 1 37 3/2 Silve gray | 1  | 00   | 3    |                        | The second      | -  | 63                  |         |
|        |                      |                     |  |      | - 1  |                        | -58.1           | 32   |                     |         |
|        |                      | 1+1+                |  |      | 13   | 1                      |                 | CDT Cample   | . 8                 |         |
| - 3    | 4                    |                     | 3  |      | 4    |                        | or i sampler    | 8  |                     |         |
|        | -                    |                     |  | Ş    | 93   | 4                      |                 | SPT Sampler  | -                   |         |

| DRI      | LLING       | LO       | G (Cont. Sheet)  | INSTALLA* Jackso       |       |                  |                 | <u> </u>   | nation CD-orn iv                   |        | SHEET  | 2<br>SHEETS | s   |
|----------|-------------|----------|--|------------------------|-------|------------------|-----------------|------------|------------------------------------|--------|--------|-------------|-----|
| PROJEC   | т           |          |  | COORDINA               |       |                  |                 | UM         | HORIZONTAL                         | VER    | TICAL  |             | 1   |
| Jack     | sonville Ha | arbor (  | GRR  | State P                | lane, | FLE              | (U.S            | . Ft.)     | NAD83                              | l N    | ЛLLW   |             |     |
| LOCATION | ON COORDI   | NATE     | s  | ELEVATIO               | N ТОР | OF B             | ORIN            | G          |                                    |        |        |             |     |
| X = 5    | 02,018      |          | ,203,023   | -44.1 F                | t.    |                  |                 |            |                                    |        |        |             | 4   |
| ELEV.    | DEPTH       | LEGEND   | CLASSIFICATION OF MATERIA  | LS                     | ĸč.   | BOX OR<br>SAMPLE | RQD<br>OR<br>UD |            | REMARKS                            |        | BLOWS/ | N-VALUE     |     |
|          |             | 1111     |  |                        | 93    | 4                |                 | -59.6      | SPT Sample                         | er     | 16     | 1 24        |     |
|          |             | <b> </b> |  |                        |       |                  |                 | 00.0       | -                                  |        | 9      |             | †   |
|          |             | <b> </b> |  |                        | 100   | 5                |                 |            | SPT Sample                         | er     | 13     | 3           | -   |
|          |             | <b> </b> | At El60.6 Ft., few angular to subal  | ngular                 |       |                  |                 | -61.1      |                                    |        | 23     | 36          | ' F |
|          |             | <b> </b> | shell up to 1-1/2"   |                        |       |                  |                 | 01.1       |                                    |        | 14     | ,           | 丰   |
|          |             |          |  |                        | 100   | 6                |                 |            | SPT Sample                         | er     | 36     | 3           | þ   |
| -62.6    | 18.5        |          |  |                        |       |                  |                 | -62.6      | •                                  |        | 50     | 86          | ·   |
| -02.0    | 10.5        | 11111    | NOTES:   |                        |       |                  |                 |            | mmer w/30" drop use                | d with |        |             | ‡   |
|          |             |          | USACE Jacksonville is the custo  | dian for               |       |                  |                 | 2.0' split | spoon (1-3/8" l.D. x 2             | O.[    | O.).   |             | Ē   |
|          |             |          | these original files.  | in                     |       |                  |                 | DT =       | Drill Time.<br>Hydraulic Pressure. |        |        |             | F   |
|          |             |          | Soils are field visually classified in accordance with the Unified Soils Classification System.  | III                    |       |                  |                 | DFR :      | = Drill Fluid Return.              |        |        |             | Ė   |
|          |             |          | 3. Set 55.5 ft. of 6" flush joint steel  | casing                 |       |                  |                 |            |                                    |        |        |             | Ē   |
|          |             |          | Water depth recorded at start of operations and referenced to the tid at Sister's Creek.   | drilling<br>al station |       |                  |                 |            |                                    |        |        |             | -   |
|          |             |          | 5. Water depth of -46.7 ft. recorded AM on 1/17/2010. Tide gage reading ft. mllw   | at 08:13<br>g of +2.6  |       |                  |                 |            |                                    |        |        |             | -   |
|          |             |          | 6. Compressive Strength Test of Ro<br>At Elevation -45.9' to -46.6' = 406 Ps   | ock Core<br>SI.        |       |                  |                 |            |                                    |        |        |             | E   |
|          |             |          | 7. Laboratory Testing Results  |                        |       |                  |                 |            |                                    |        |        |             | Ė   |
|          |             |          | SAMPLE SAMPLE LABORA ID DEPTH CLASSIFIC  |                        |       |                  |                 |            |                                    |        |        |             | -   |
|          |             |          | 1 0.0/1.4 SP-S   | <br>M*                 |       |                  |                 |            |                                    |        |        |             | Ė   |
|          |             |          | *Lab visual classification based on c<br>curve. No Atterberg limits.   | gradation              |       |                  |                 |            |                                    |        |        |             | -   |
|          |             |          | , and the second |                        |       |                  |                 |            |                                    |        |        |             | -   |
|          |             |          |  |                        |       |                  |                 |            |                                    |        |        |             | F   |
|          |             |          |  |                        |       |                  |                 |            |                                    |        |        |             | _;  |
|          |             |          |  |                        |       |                  |                 |            |                                    |        |        |             | -   |
|          |             |          |  |                        |       |                  |                 |            |                                    |        |        |             | F   |
|          |             |          |  |                        |       |                  |                 |            |                                    |        |        |             | F   |
|          |             |          |  |                        |       |                  |                 |            |                                    |        |        |             | ŀ   |
|          |             |          |  |                        |       |                  |                 |            |                                    |        |        |             | Ł   |
|          |             |          |  |                        |       |                  |                 |            |                                    |        |        |             | E   |
|          |             |          |  |                        |       |                  |                 |            |                                    |        |        |             | F   |
|          |             |          |  |                        |       |                  |                 |            |                                    |        |        |             | F   |
|          |             |          |  |                        |       | L_               | L               |            |                                    |        |        |             | F   |

| 45.9 0.0  45.9 0.0  45.9 0.0  1.1  1.1  1.1  1.1  1.1  1.1  1.1   | DDI    | LING  | 100   | DIVISION   | INSTAL         |           |                    |  | SHEET 1  |      |  |  |
|---|--------|---|---|--|----------------|-----------|--------------------|--|--|------|--|--|
| Jacksonville Harbor GRR  ST.JOHN'S RIVER CHANNEL  BORING DESIGNATION  CB-HPM09-19  X = 503,519 Y = 2,203,743  THE CORRESPONDED TO CONTROLLER  MARING STICKLER  Maryin Strickland  DEGRAFON  BEARING  BEARING  THE CHANNEL  15. DATE BORING  DESTROEM  MALIBRO ADDRESS  MARIN Strickland  DEGRAFON  BEARING  THE LEVATION GROUND WATER  THORAGON  THE LEVATION TOP OF BORING   |        |   | LUC   | South Atlantic   |                |           |                    |  | OF 2 SH  | EETS |  |  |
| SST. JOHN'S RIVER CHANNEL  BORNE DESCRIPTION  LOCATION COORDINATES  CREATION 199 19   |        |   |   | 000  | 1320           |           |                    |  | Meaning  |      |  |  |
|   | 100    |   |   |  | 10. CC         |           |                    |  |  |      |  |  |
| CB-  FPM09-19   |        |   |   | The second secon | 11. M          |           |                    |  |  |      |  |  |
| Challenge Engineering & Testing, Inc. 2009D08 12, TOTAL SAMPLES 10 0  NAME OF DELICE MARY STRICKS 13, TOTAL NUMBER CORE BOXES 0  MARY STRICKS 10 10 10 10 10 10 10 10 10 10 10 10 10  |        |   |   |  |                |           |                    |  | The second secon |      |  |  |
| Challenge Engineering & Testing, Inc. 2009/08  Make of PRILLER Marvin Strickland    13. TOTAL HUMBER CORE BOXES   0   |        |   |   |  | 12 TC          | ITAL      | SAMPI              |  | UNDISTURBED  | (UD) |  |  |
| Mayori Strickland    Miscriton of Bornio   Dec. From   Strate   Tidal   Tidal   Strate   Tidal   Ti |        |   |   | ering & Testing, Inc.   2009D08  |                |           | W. O.              | 10   | 0  |      |  |  |
| Interception of Borning   Properties   Pro  |        |   |   |  | 13. TO         | TAL       | NUMB               |  |  |      |  |  |
| 15. DATE BORING   |        |   |   | G DEG. FROM BEARING  | 14. EL         | EVAT      | ION G              | When the state of  |  |      |  |  |
| 17. TOTAL RECOVERY FOR BORING   91 %   17. TOTAL RECOVERY FOR BORING   91 %   18. SIGNATURE AND TITLE OF INSPECTOR   V. J. Thompson II I, Civil Engineer   17. SPT Sampler   17. V. J. Thompson II I, Civil Engineer   17. SPT Sampler   17. V. J. Thompson II I, Civil Engineer   17. V  |        |   | 32  | VERTICAL   | 15. DA         | TE B      | ORING              |  |  |      |  |  |
| TOTAL DEPTH OF BORING   17.9 Ft.   17.9 Ft.   17.9 Ft.   18. SIGNATURE AND TITLE OF INSPECTOR   17.9 Ft.   1  | . THIC | KNESS OF  | OVER  | BURDEN N/A   | 10.00          |           | 28383              |  |  |      |  |  |
| 17.9 Ft.   V. J. Thompson III, Civil Engineer   REG.   RE  | . DEPT | TH DRILLE                                       | INTO  | ROCK N/A   | 1,5000, 11,012 | 41.5 10.0 | 190 3-60           | ACTIVITIES AND ACTIVI |  |      |  |  |
| At El49.4 Ft., moderately hard, slightly weathered, pirit in the state of the      | . тот  | AL DEPTH  | OF BO   | ting 17.9 Ft.  | 10. 31         |           | -                  |  |  |      |  |  |
| 45.9 0.0    A   | ELEV.  | DEPTH   | DEPTH CLASSIFICATION OF MATERIALS                                   |  |                |           | REC. SWOOD REMARKS |  |  |      |  |  |
| LIMESTONE, sandy, fossiliferous, very soft, highly weathered, fine grained, porous, moist, 5Y 5/2 olive gray   100 2   47.4   39   23   247.4   39   248.9   3   300.3   249.7   SPT Sampler   3   300.3   3  | 45.0   | 0.0   |   |  |                |           |                    | 45.0   |  | -    |  |  |
| At El49.4 Ft., moderately hard, slightly weathered, pitted, shelly sand filled pits, 57.9   12.0  | 10.5   |   | III   |  |                |           |                    | 10.0   | 4  | -    |  |  |
| At El49.4 Ft., moderately hard, slightly weathered, pitted, shelly sand filled pits, 57.9   12.0  |        |   | nignly weathered, fine grained, porous,<br>moist. 5Y 5/2 olive grav | 67   | 1              |           | SPT Sample         |  |  |      |  |  |
| At El49.4 Ft., moderately hard, slightly weathered, pitted, shelly sand filled pits, sy 6/2 light olive gray  At El49.4 Ft., moderately hard, slightly weathered, pitted, shelly sand filled pits, sy 6/2 light olive gray  100   | 6      | - P   | and a second start  | 37   | 1              |           | 1000               | 9  | 56   |      |  |  |
| At El49.4 Ft., moderately hard, slightly weathered, pitted, shelly sand filled pits, sy 6/2 light olive gray  At El49.4 Ft., moderately hard, slightly weathered, pitted, shelly sand filled pits, sy 6/2 light olive gray  100   |        | athe  |   | -  |                |           | -47.4              |  |  |      |  |  |
| At El49.4 Ft., moderately hard, slightly weathered, pitted, shelly sand filled pits, sy 6/2 light olive gray  At El49.4 Ft., moderately hard, slightly weathered, pitted, shelly sand filled pits, sy 6/2 light olive gray  100   |        | _ ×   |   | 15.55  |                |           | 50E15 - W.         | -  |  |      |  |  |
| At El49.4 Ft., moderately hard, slightly weathered, pitted, shelly sand filled pits, sy 6/2 light olive gray  At El49.4 Ft., moderately hard, slightly weathered, pitted, shelly sand filled pits, sy 6/2 light olive gray  100 4 -50.8 SPT Sampler 50/0.4¹  4 x 5-1/2" Diamond Impregnated Bit DT = 2 mins HP = 300 psi DFR = 30 %  57.9 12.0 SPT Sampler 50/0.4¹  At El55.4 Ft., soft, moderately weathered, massive bedding, bedding orientation  4 x 5-1/2" Diamond Impregnated Bit DT = 3 mins HP = 300 psi DFR = 30 %  57.9 12.0 SPT Sampler 50/0.4¹  4 x 5-1/2" Diamond Impregnated Bit DT = 3 mins HP = 300 psi DFR = 30 %  57.9 12.0 SPT Sampler 12.0 SPT          |        |   |   |  |                | 2         |                    | SPT Sample   | -  | 7    |  |  |
| At El49.4 Ft., moderately hard, slightly weathered, pitted, shelly sand filled pits, 5Y 6/2 light olive gray  At El49.4 Ft., moderately hard, slightly weathered, pitted, shelly sand filled pits, 5Y 6/2 light olive gray  At El49.4 Ft., moderately hard, slightly weathered, pitted, shelly sand filled pits, 5Y 6/2 light olive gray  Advanced Boring  -50.4 Advanced Boring  -50.8 SPT Sampler  50/0.3'  4 x 5-1/2" Diamond Impregnated Bit DT = 2 mins  HP = 300 psi DFR = 30 %  -52.9  At El55.4 Ft., soft, moderately weathered, massive bedding, bedding orientation  At El55.4 Ft., soft, moderately weathered, massive bedding, bedding orientation  At El56.9 Ft., very soft  SAND, silty, mostly angular to subangular fine to medium-grained sand-sized quartz, little silt, trace phosphate, moist, 5Y 6/2 light olive gray  SAND, silty, mostly angular to subangular fine to medium-grained sand-sized quartz, little silt, trace phosphate, moist, 5Y 6/2 light olive gray  SPT Sampler  50/0.3'  4 x 5-1/2" Diamond Impregnated Bit DT = 3 mins HP = 300 psi DFR = 30 %  SPT Sampler  12  SPT Sampler  12  12  13  14  15  15  16  17  17  18  19  10  10  4 x 5-1/2" Diamond Impregnated Bit DT = 3 mins HP = 300 psi DFR = 30 %  |        | _ [   | III   |  |                |           |                    | -48.9  | 3  |      |  |  |
| weathered, pitted, shelly sand filled pits,  57 6/2 light olive gray  100 4  -50.8 SPT Sampler 50/0.4'  -50.8 SPT Sampler 50/0.4'  -50.8 SPT Sampler 50/0.4'  4 x 5-1/2" Diamond Impregnated Bit DT = 2 mins HP = 300 psi DFR = 30 %  -52.9  Run RQD  -52.9  Run RQD  -52.9  Run RQD  -52.9  Run RQD  -52.9  Run RQD  -52.9  At El55.4 Ft., soft, moderately weathered, massive bedding, bedding orientation  At El56.9 Ft., very soft  -57.9 12.0  SAND, silty, mostly angular to subangular fine to medium-grained sand-sized quartz, little silt, trace phosphate, moist, 5Y 6/2 light olive gray  -50.4 Advanced Boring  -50.8 SPT Sampler 50/0.4'  4 x 5-1/2" Diamond Impregnated Bit DT = 3 mins HP = 300 psi DFR = 30 %  -57.9  -57.9  SAND, silty, mostly angular to subangular fine to medium-grained sand-sized quartz, little silt, trace phosphate, moist, 5Y 6/2 light olive gray  -57.9  SPT Sampler 12   |        | ¥   | III   |  | 100            | 3         |                    | SPT Sample   | r  |      |  |  |
| SAND, silty, mostly angular to subangular fine to medium-grained sand-sized quartz, little silty and solve gray  57.9 12.0   Advanced Boring  100 4 -50.8 SPT Sampler 50/0.4'  4 x 5-1/2" Diamond Impregnated Bit DT = 2 mins HP = 300 psi DFR = 30 %  -52.9  Run RQD #1 20   Run RQD #2 27   Run RQD #2 27   At El55.4 Ft., soft, moderately weathered, massive bedding, bedding orientation  At El56.9 Ft., very soft  57.9 12.0   SAND, silty, mostly angular to subangular fine to medium-grained sand-sized quartz, little silt, trace phosphate, moist, 5Y 6/2 light olive gray  100 4 -50.8 SPT Sampler 50/0.4'  4 x 5-1/2" Diamond Impregnated Bit DT = 3 mins HP = 300 psi DFR = 30 %  57.9 12.0   SAND, silty, mostly angular to subangular fine to medium-grained sand-sized quartz, little silt, trace phosphate, moist, 5Y 6/2 light olive gray  57.9 12.0   SPT Sampler 12 olive gray  4 x 5-1/2" Diamond Impregnated Bit DT = 3 mins HP = 300 psi DFR = 30 %   | 4      |   | III   | At El49.4 Ft., moderately hard, slightly weathered, pitted, shelly sand filled pits.   | 1              |           |                    |  |  |      |  |  |
| 1   |        |   | III   |  |                |           |                    | -50.4 Advanced Bor   | ing  |      |  |  |
| 86 Run RQD #1 20 4 x 5-1/2" Diamond Impregnated Bit DT = 2 mins HP = 300 psi DFR = 30 %  4 x 5-1/2" Diamond Impregnated Bit DT = 2 mins HP = 300 psi DFR = 30 %  4 x 5-1/2" Diamond Impregnated Bit DT = 2 mins HP = 300 psi DFR = 30 %  4 x 5-1/2" Diamond Impregnated Bit DT = 3 mins HP = 300 psi DFR = 30 %  At El55.4 Ft., soft, moderately weathered, massive bedding, bedding orientation  4 x 5-1/2" Diamond Impregnated Bit DT = 3 mins HP = 300 psi DFR = 30 %  4 x 5-1/2" Diamond Impregnated Bit DT = 3 mins HP = 300 psi DFR = 30 %  57.9 12.0 SAND, silty, mostly angular to subangular fine to medium-grained sand-sized quartz, little silt, trace phosphate, moist, 5Y 6/2 light oflive gray (SM)  | - 3    |   | ITI   |  | 100            | 4         |                    | 77777  | er 50/0.4'   |      |  |  |
| At El55.4 Ft., soft, moderately weathered, massive bedding, bedding orientation  At El56.9 Ft., very soft  SAND, silty, mostly angular to subangular fine to medium-grained sand-sized quartz, little silt, trace phosphate, moist, 57 6/2 light olive gray (SM)  At El56.9 Ft., very soft  SAND, silty, mostly angular to subangular fine to medium-grained sand-sized quartz, olive gray (SM)   |        |   |   |  | 86             | Run<br>#1 | RQD<br>20          | DT = 2 mins<br>HP = 300 ps<br>DFR = 30 %   | i<br>i   |      |  |  |
| SAND, silty, mostly angular to subangular fine to medium-grained sand-sized quartz, little silt, trace phosphate, moist, 5Y 6/2 light olive gray (SM)   | 57.9   | Ocerately Weathered                             |   | massive bedding, bedding orientation   | 90             | Run<br>#2 | RQD<br>27          | DT = 3 mins<br>HP = 300 ps<br>DFR = 30 %   | i  |      |  |  |
| fine to medium-grained sand-sized quartz, little silt, trace phosphate, moist, 5Y 6/2 light olive gray (SM)  little silt, trace phosphate, moist, 5Y 6/2 light olive gray (SM)  | · 01.9 | 7.9 12.0 2                                      | THIT  | SAND, silty, mostly angular to subangular  |                |           |                    | -01.0  | 12   |      |  |  |
| olive gray (SM)   |        | fine to medium-grained sand-sized quartz,       |   | 100  | E              |           | CDT Comple         | -  | 1  |      |  |  |
| -59.4   |        | little silt, trace phosphate, moist, 5Y 6/2 lig | olive gray (SM)   | 100  | 3              |           |                    | 10 <del></del>   | 31   |      |  |  |
|   |        |   |   | 0  |                |           | -59.4              | 1  | -  |      |  |  |
| - 100 6 SPT Sampler 20 50/0.4'  |        | -   |   |  | 100            | 6         |                    |  | r  |      |  |  |
| -60.9 Advanced Boring   |        |   | <u> </u>  |  |                |           |                    | A A second Des   | ing  |      |  |  |

| DR     | ILLING      | Jackso |   |                             |      | <u> </u>         |                 |                               | SHEET 2  | IEETS  |                     |         |  |
|--------|-------------|--------|---|-----------------------------|------|------------------|-----------------|-------------------------------|--|--------|---------------------|---------|--|
| PROJEC | т           |        |   | COORDINA                    |      |                  |                 | UM                            | HORIZONTAL   | VEF    | RTICAL              |         |  |
| Jack   | sonville Ha | GRR    | State F   |                             |      |                  |                 | NAD83                         | 1  | MLLW   |                     |         |  |
| LOCATI | ON COORDI   | NATE   | s   | ELEVATIO                    |      |                  |                 |                               |  |        |                     |         |  |
| X = !  | 503,819     | Y = 2  | ,203,743  | -45.9 F                     | t.   |                  |                 |                               |  |        |                     |         |  |
| ELEV.  | DEPTH       | LEGEND | CLASSIFICATION OF MATERIA   | ıLS                         | RÉC. | BOX OR<br>SAMPLE | RQD<br>OR<br>UD |                               | REMARK   | 5      | BLOWS/<br>0.5 FT.   | N-VALUE | <del></del> 15   |
|        |             |        |   |                             | 100  | 7                |                 | -62.4                         | SPT Samp   | ler    | 10<br>12<br>25      | 37      | - 13<br>-<br>-<br>-<br>-<br>-  |
| -63.8  | 17.9        |        |   |                             | 86   | 8                |                 | -63.8                         | SPT Samp   |        | 20<br>25<br>50/0.4' | - 75+   | -<br>-<br>-<br>-   |
|        |             |        | NOTES:  1. USACE Jacksonville is the custof these original files.  2. Soils are field visually classified accordance with the Unified Soils Classification System.  3. Set 55.5 ft. of 6" flush joint steel  4. Water depth recorded at start of operations and referenced to the tidat Sister's Creek.  5. Water depth of -48.9 ft. recorded AM on 1/16/2010. Tide gage reading ft. mllw | casing drilling lal station |      |                  |                 | 2.0' split Abbrevia DT = HP = | mmer w/30" drop us spoon (1-3/8" I.D. x ations: Drill Time. Hydraulic Pressure.  Drill Fluid Return. | ed wit | h<br>D.).           |         | - 20<br>- 20<br>- 20<br>- 20<br>- 25<br>- 25<br>- 25<br>- 25<br>- 27<br>- 25<br>- 27<br>- 27<br>- 27<br>- 27<br>- 27<br>- 27<br>- 27<br>- 27 |

| DRILLING L                        | OG DIVI  | SION  | INSTAL | LATI             | ON              |                    |                  | SHEET 1           |         |  |  |  |  |  |  |
|-----------------------------------|--|---|--------|------------------|-----------------|--------------------|------------------|-------------------|---------|--|--|--|--|--|--|
| . PROJECT                         | 5  | South Atlantic  | 10000  |                  | ille D          |                    | 2.0,000          | OF 2 SH           | EETS    |  |  |  |  |  |  |
|                                   | ladas CDD  |   | 100    | T. C.            | 100             | SYSTEM/DATUM       | Remarks          | VERTICAL          |         |  |  |  |  |  |  |
| Jacksonville F<br>ST. JOHN'S F    |  |   | 100    |                  |                 | ne, FLE (U.S. Ft.) | Programme "      | MLLW              |         |  |  |  |  |  |  |
| . BORING DESIGNA                  |  | LOCATION COORDINATES  |        |                  |                 | RER'S DESIGNATION  |                  | UTO HAMME         | R       |  |  |  |  |  |  |
| CB-JHPM09-2                       |  | X = 506,734 Y = 2,203,513   |        | Died             | rich D          | 0-50 Truckrig      | ⊠ M              | IANUAL HAM        | MER     |  |  |  |  |  |  |
| Challenge En                      |  | CONTRACTOR FILE NO. Testing, Inc. 2009D08                                   | 12. TO | TAL              | SAMPI           |                    |                  | NDISTURBED        | (UD)    |  |  |  |  |  |  |
| Challenge Eng. NAME OF DRILLER    |  | resting, Inc. ; 2009D08   | 13. TO | TAL              | NUMB            | ER CORE BOXES      | 2                | 0                 |         |  |  |  |  |  |  |
| Marvin Strickla                   |  | Table 1   | 14. EL | EVAT             | ION G           | ROUND WATER        | TIDAL            |                   |         |  |  |  |  |  |  |
| DIRECTION OF BO VERTICAL INCLINED | RING   | DEG. FROM BEARING VERTICAL  | 15. DA | TE B             | ORING           |                    | STARTED 01-14-10 | 01-14-10          |         |  |  |  |  |  |  |
| . THICKNESS OF O                  | VERBURDEN  | N/A   | 16. EL | EVAT             | ION T           | OP OF BORING       | -43.6 Ft.        |                   |         |  |  |  |  |  |  |
| . DEPTH DRILLED II                | NTO ROCK   | N/A   | 17. TO | TAL              | RECOV           | VERY FOR BORING    | 84 %             |                   |         |  |  |  |  |  |  |
|                                   | 2. 34982-20183   |   | 18. SI | GNAT             | URE A           | IND TITLE OF INSPI | ECTOR            |                   |         |  |  |  |  |  |  |
| . TOTAL DEPTH OF                  | BORING   | 21.0 Ft.  |        | _                | _               | npson III, Civil E | ingineer         |                   |         |  |  |  |  |  |  |
| ELEV. DEPTH                       | LEGEND   | CLASSIFICATION OF MATERIALS   | RÉC.   | BOX OR<br>SAMPLE | RQD<br>OR<br>UD |                    | REMARKS          | BLOWS/<br>0.5 FT. | N-VALUE |  |  |  |  |  |  |
| 43.6 0.0                          |  |   | 7      |                  |                 | -43.6              |                  |                   |         |  |  |  |  |  |  |
|                                   |  | , poorly-graded with silt, mostly   |        |                  |                 | 1 1                |                  | 1                 |         |  |  |  |  |  |  |
| 1 1                               | mediu  | ar to subangular fine to<br>m-grained sand-sized quartz, some               | 67     | 1                |                 | leg 5              | SPT Sampler      | 2                 |         |  |  |  |  |  |  |
|                                   |  | ar shell up to 1-1/2", few silt, wet,                                       |        |                  |                 | 45.4               |                  | 5                 | 7       |  |  |  |  |  |  |
|                                   | At El.   | -43.9 Ft., 5Y 4/1 dark gray   | 7      | -                |                 | -45.1              |                  | 7                 |         |  |  |  |  |  |  |
|                                   |  | -44.4 Ft., few angular shell up to 3/8", I light olive gray                 | 87     | 2                |                 |                    | SPT Sampler      | 7                 |         |  |  |  |  |  |  |
| F 13                              | At El.   | -45.1 Ft., few angular shell up to 1-1/2                                    |        | _                |                 |                    | or i Samplei     | -                 | 15      |  |  |  |  |  |  |
|                                   | 111  |   |        |                  |                 | -46.6              |                  | 8                 |         |  |  |  |  |  |  |
| 1 1                               | +14  |   | -32    | 137              |                 |                    |                  | 12                |         |  |  |  |  |  |  |
|                                   | 111  |   | 93     | 3                |                 |                    | SPT Sampler      | 14                | 30      |  |  |  |  |  |  |
| 1 1                               | At El.   | -47.9 Ft., some angular shell up to 2"                                      | 4      |                  |                 | -48.1              |                  | 16                | 3.6     |  |  |  |  |  |  |
| L B                               | H  |   |        |                  |                 | FC                 |                  | 3                 |         |  |  |  |  |  |  |
|                                   | tt <b>l</b>  |   | 80     | 4                |                 |                    | SPT Sampler      | 5                 | 19      |  |  |  |  |  |  |
| E E                               | 111  |   |        |                  |                 | -49.6              |                  | 14                | 10      |  |  |  |  |  |  |
|                                   |  |   |        |                  |                 |                    |                  | 16                |         |  |  |  |  |  |  |
|                                   | TT I   | -50.1 Ft., trace angular to subangular up to 3/8"                           | 100    | 5                |                 | 11 - 12 1          | SPT Sampler      | 12                | 25      |  |  |  |  |  |  |
| 51.1 7.5                          |  |   |        |                  |                 | -51.1              |                  | 13                | 25      |  |  |  |  |  |  |
| 5                                 | SHEL   | L, mostly angular shell up to 1", little unded limestone up to 3/4", little |        | 3                |                 |                    |                  | 3                 |         |  |  |  |  |  |  |
|                                   | fine-gr  | ained sand-sized quartz, wet,   | 73     | 6                |                 |                    | SPT Sampler      | 5                 | 40      |  |  |  |  |  |  |
|                                   | 5Y 6/2   | light olive gray  |        |                  |                 | -52.6              |                  | 7                 | 12      |  |  |  |  |  |  |
| D                                 | 22.2   |   |        |                  |                 | OZ.O               |                  | 23                |         |  |  |  |  |  |  |
|                                   | SAND   | , poorly-graded with silt, mostly fine to                                   | 100    | 7                |                 | 100                | SPT Sampler      | 27                |         |  |  |  |  |  |  |
|                                   | medium-grained sand-sized quartz, moist, moderate cementation, 5Y 7/1 light gray (SP-SM) |   |        |                  | E4.1            | ST COLUMN          | 30               | 57                |         |  |  |  |  |  |  |
|                                   |  | 19  |        |                  | -54.1           |                    | 8                |                   |         |  |  |  |  |  |  |
| - 6                               |  |   | 87     | 0                |                 |                    | CDT Complet      | 7                 |         |  |  |  |  |  |  |
| F                                 | ::FI   |   | 07     | 8                |                 | 1.0                | SPT Sampler      | -                 | 21      |  |  |  |  |  |  |
| F 8                               | At El55.6 Ft., 5Y 4/1 dark gray  | -55 6 Ft -5Y 4/1 dark grav  | 100    | 9                |                 | -55.6              | CDT Camples      | 14<br>50/0 4'     |         |  |  |  |  |  |  |
|                                   |  | 100   | 9      |                  | -56.0           | SPT Sampler        | 50/0.4           |                   |         |  |  |  |  |  |  |
|                                   |  |   |        |                  |                 | Advanced Boring    |                  |                   |         |  |  |  |  |  |  |
| 1 2                               |  |   | -      |                  |                 | -57.1              |                  |                   |         |  |  |  |  |  |  |
| _ <u>L</u> _ E                    |  | 75  | 10     |                  | -57.5           | SPT Sampler        | 50/0.4'          |                   |         |  |  |  |  |  |  |
| - E                               |  |   |        |                  |                 | Craft              | Advanced Boring  |                   | 7       |  |  |  |  |  |  |
| F 8                               | -At El58.1 Ft., no cementation   |   |        |                  |                 | -58.6              | Doining          |                   |         |  |  |  |  |  |  |

SAJ FORM 1836 JUN 02

(Continued)

| DRI    | IIING                       | 100    | G (Cont. Sheet)   | INSTALLA  |          |                  |                 |   |  | - 1                | SHEET   |                |       |
|--------|-----------------------------|--------|---|---|----------|------------------|-----------------|---|--|--------------------|---|----------------|-------|
|        |                             |        |   | Jackso  |          |                  |                 |   | 1  |                    |   | SHEETS         | 4     |
| PROJEC |                             |        | SDD   | COORDINA  |          |                  |                 |   | HORIZONTAL   | VERT               |   |                |       |
|        | sonville Ha                 |        |   | State F   |          |                  |                 |   | NAD83  | ! IVIL             | LLW   |                | 1     |
|        | <b>ON COORD!</b><br>506,734 |        |   | -43.6 F   |          | OF B             | ORIN            | G   |  |                    |   |                |       |
| ELEV.  | DEPTH                       | LEGEND | CLASSIFICATION OF MATERIAL  | •   | REC.     | BOX OR<br>SAMPLE | RQD<br>OR<br>UD |   | REMARKS  |                    | BLOWS/  | N-VALUE        |       |
| 64.6   | 21.0                        | TEGE   | NOTES:  1. USACE Jacksonville is the custo these original files.  2. Soils are field visually classified i accordance with the Unified Soils Classification System.  3. Set 55.5 ft. of 6" flush joint steel of the second of the | dian for n casing drilling al station at 12:45 g of +1.4  TORY CATION | 93 73 73 | 11 12 13 14      | ORD             | -60.1<br>-61.6<br>-63.1<br>-64.6<br>140# ha<br>2.0' split | SPT Sample  SPT Sample  SPT Sample  SPT Sample  spoon (1-3/8" I.D. x 2 | er<br>er<br>d with | 20<br>26<br>28<br>25<br>23<br>37<br>11<br>11<br>16<br>9<br>16<br>32 | 54 54 60 27 48 | -1515 |
|        |                             |        |   |   |          |                  |                 |   |  |                    |   |                | -     |
| CALE   | <b>DM 402</b>               | 6 A    |   |   |          |                  |                 |   |  |                    |   |                | -35   |

| DRI  | LLING                                   | LOG               | DIVISION   | INSTAI | LATI             | ON              |                            | SHEET 1           | 120     |
|------|---|-------------------|--|--------|------------------|-----------------|----------------------------|-------------------|---------|
| PRO  |   |                   | South Atlantic   |        | _                | ville D         |                            | OF 2 SH           | EETS    |
|      | acksonville                             | . Harb            | or CBB   | 1500   | -                | 200             | SYSTEM/DATUM HORIZONTAL    | VERTICAL          |         |
| 100  | 270000000000000000000000000000000000000 |                   | R CHANNEL  | .0. 0. |                  |                 | ne, FLE (U.S. Ft.) NAD83   | MLLW              |         |
|      | NG DESIG                                |                   |  | 11. M  |                  |                 | RER'S DESIGNATION OF DRILL |                   | R       |
| -    | B-JHPM0                                 |                   | X = 507,874 Y = 2,202,216  |        | Diec             | Irich D         | 0-50 Truckrig              | MANUAL HAN        | MER     |
|      | LING AGEN                               |                   | CONTRACTOR FILE NO.  | 12. TO | TAL              | SAMPI           | DISTURBED                  | UNDISTURBED       | (UD)    |
|      | E OF DRILL                              |                   | ering & Testing, Inc. 2009D08  | 13. TO | TAL              | NUMB            | ER CORE BOXES 1            | 0                 |         |
|      | arvin Stric                             |                   | Total and Total and  | 14. El | EVAT             | ION G           | ROUND WATER TIDAL          |                   |         |
| X    | CTION OF<br>PERTICAL<br>NCLINED         | BORING            | DEG. FROM BEARING VERTICAL   | 15. D  | TE B             | ORING           | STARTED 01-13-10           | 01-13-1           | 4.0     |
|      | KNESS OF                                | OVERB             | URDEN N/A  | 16. EI | EVA1             | ION T           | OP OF BORING -42.4 Ft.     | , 01-10-1         |         |
| DEPT | TH DRILLE                               | OTNI              | ROCK N/A   | 17. TO | TAL              | RECOV           | VERY FOR BORING 90 %       |                   |         |
| TOT  | N. DEDTH                                | OF BOD            | A CONTRACTOR OF THE CONTRACTOR | 18. SI |                  |                 | AND TITLE OF INSPECTOR     |                   |         |
| 101/ | AL DEPTH                                | OF BUR            | ing 21.0 Ft.   |        | _                | _               | npson III, Civil Engineer  |                   | -       |
| LEV. | DEPTH                                   | LEGEND            | CLASSIFICATION OF MATERIALS  | RÉC.   | BOX OR<br>SAMPLE | RQD<br>OR<br>UD | REMARKS                    | BLOWS/<br>0.5 FT. | N-VALUE |
| 2.4  | 0.0                                     |                   |  |        |                  |                 | -42.4                      |                   |         |
|      |   |                   | SAND, poorly-graded, mostly angular to   |        |                  |                 |                            | 9                 |         |
|      |   | 333               | subangular medium to coarse-grained sand-sized quartz, few angular shell up to   | 80     | 1                |                 | SPT Sample                 | r 11              | -       |
|      |   |                   | 1/4", wet, moderate cementation, 5Y 6/2 light  | nt     |                  |                 | 42.0                       | 14                | 25      |
|      |   |                   | olive gray (SP)  | -      |                  |                 | -43.9                      | 10                |         |
| - 1  | _                                       |                   |  | 07     | 2                |                 | CDT Camala                 | 1                 |         |
|      |   |                   |  | 87     | 2                |                 | SPT Sample                 |                   | 21      |
|      | =                                       |                   | AAFI AFAFA disassesses aboli   |        |                  |                 | -45.4                      | 12                |         |
| ı    |   |                   | At El45.4 Ft., discontinue shell   |        | 15               |                 |                            | 10                |         |
|      | 5                                       | ::::              |  | 87     | 3                |                 | SPT Sample                 | r 12              | 30      |
| 1    | -                                       |                   |  |        |                  |                 | -46.9                      | 18                | 50      |
| 10   | •                                       |                   |  | 107.7  |                  |                 |                            | 15                |         |
|      | -                                       |                   |  | 80     | 4                |                 | SPT Sample                 | r 14              |         |
|      |   |                   |  |        |                  |                 | -48.4                      | 17                | 31      |
|      |   |                   |  | *      |                  | i               | -40.4                      | 11                |         |
|      |   |                   |  | 73     | 5                |                 | SPT Sample                 |                   | 1       |
| !    |   |                   |  | ,,,    | _                |                 |                            | 16                | 28      |
| 9.9  | 7.5                                     | : iii             | SAND, poorly-graded with silt, mostly  |        | -                | 1               | -49.9                      |                   |         |
| -    |   |                   | angular to subangular fine to  | 400    |                  |                 | A                          | 11                |         |
|      |   |                   | medium-grained sand-sized quartz, trace<br>angular to subangular shell up to 1/8"  | 100    | 6                |                 | SPT Sample                 | 1                 | 26      |
| 1.4  | 9.0                                     | ::!!              | (SP-SM)  |        |                  |                 | -51.4                      | 14                |         |
| 1.9  | 9.5                                     |                   | LIMESTONE, sandy, sparsely fossiliferous, soft, slightly weathered, fine grained, moist, 5Y 6/2 light olive gray   | 100    | 7                |                 | -52.2 SPT Sample           | r 9<br>50/0.3'    |         |
| ŀ    | - after                                 |                   | LIMESTONE, hard  |        |                  |                 | Advanced Bori              | ing               |         |
|      | , Me                                    |                   |  | 100    | 8                |                 | -52.9<br>-53.3 SPT Sample  |                   |         |
|      | Slightly Weathered                      |                   |  | ,00    |                  |                 | oo.o or rouniple           | . 00/0.4          |         |
| , ,  | 12.0                                    | 註                 |  |        |                  |                 | Advanced Bori              | ing               |         |
| 4.4  | 12.0                                    | III<br>III<br>ITI | LIMESTONE, very soft, highly weathered   |        |                  |                 | -V1.11                     | 7                 | -       |
|      |   |                   | Control of the second second second  | 100    | 9                |                 | CDT Comple                 | -                 | 8       |
|      | Highly Weathered                        | III               |  | 100    | 9                |                 | SPT Sample                 |                   | 27      |
|      | Neat                                    | ITI               |  |        |                  |                 | -55.9                      | 15                |         |
|      | , A                                     | ITI               |  |        |                  |                 |                            | 12                |         |
|      | Ĭ                                       | III               |  | 100    | 10               |                 | SPT Sample                 | r 44              | 81      |
| 57.4 | 15.0 V                                  | ITI               |  |        |                  |                 | -57.4                      | 37                | ٠.      |

| DPI    | ILLING                      | 100    | G (Cont. Sheet)   | INSTALLA               |        |                  |                 |            |                        |        | SHEET          | 2               | 1                      |
|--------|-----------------------------|--------|---|------------------------|--------|------------------|-----------------|------------|------------------------|--------|----------------|-----------------|------------------------|
|        | LLING                       |        | 3 (Cont. Sneet)   | Jackso                 | nville | Distr            | ict             |            |                        |        | <b>OF</b> 2    | SHEETS          | 4                      |
| PROJEC |                             |        |   | COORDINA               |        |                  |                 |            | HORIZONTAL             | 1      | TICAL          |                 |                        |
|        | sonville Ha                 |        |   | State F                |        |                  |                 |            | NAD83                  | i M    | 1LLW           |                 | -                      |
|        | <b>on coordi</b><br>507,874 |        |   | -42.4 F                |        | OF B             | ORIN            | G          |                        |        |                |                 |                        |
| ELEV.  | DEPTH                       | LEGEND | CLASSIFICATION OF MATERIAL  | •                      | RÉC.   | BOX OR<br>SAMPLE | ROD<br>OR<br>UD |            | REMARKS                |        | BLOWS/         | N-VALUE         |                        |
|        |                             |        | SILT, inorganic-L, low plasticity, hard 5Y 7/1 light gray (ML)                                  | d, dry,                | 100    | 11               |                 | -58.9      | SPT Sample             | er     | 15<br>20<br>24 | 44              | 15<br>-<br>-<br>-<br>- |
|        |                             |        |   |                        | 67     | 12               |                 | -60.4      | SPT Sample             | er     | 10<br>15<br>24 | 39              | -<br>-<br>-<br>-<br>-  |
|        |                             |        | At El60.4 Ft., medium plasticity, h clay, 5Y 6/2 light olive gray                               | ard, few               | 100    | 13               |                 | -61.9      | SPT Sample             | er     | 9<br>17<br>23  | <del> </del> 40 | -<br>-<br>-<br>-<br>-  |
| -63.4  | 21.0                        |        |   |                        | 100    | 14               |                 | -63.4      | SPT Sample             | er     | 28<br>29<br>37 | 66              | -<br>-20<br>-<br>-     |
|        |                             |        | NOTES:  |                        |        |                  |                 | 140# ha    | mmer w/30" drop use    | d with | 1              |                 |                        |
|        |                             |        | USACE Jacksonville is the custo these original files.   | dian for               |        |                  |                 | 2.0' split | spoon (1-3/8" I.D. x 2 | !" O.E | ).).           |                 | -                      |
|        |                             |        | Soils are field visually classified in accordance with the Unified Soils Classification System. | n                      |        |                  |                 |            |                        |        |                |                 | -<br>-<br>-            |
|        |                             |        | 3. Set 55.5 ft. of 6" flush joint steel   | casing                 |        |                  |                 |            |                        |        |                |                 | -                      |
|        |                             |        | Water depth recorded at start of operations and referenced to the tidat Sister's Creek.         | drilling<br>al station |        |                  |                 |            |                        |        |                |                 | -<br>-<br>-25          |
|        |                             |        | 5. Water depth of -46.1 ft. recorded AM on 1/13/2010. Tide gage reading ft. mllw                | at 08:39<br>g of +3.7  |        |                  |                 |            |                        |        |                |                 | -<br>-<br>-            |
|        |                             |        | Additional lab test results were a February 2011  | dded                   |        |                  |                 |            |                        |        |                |                 | -                      |
|        |                             |        | 7. Laboratory Testing Results   |                        |        |                  |                 |            |                        |        |                |                 | <u> </u>               |
|        |                             |        | SAMPLE SAMPLE LABORA<br>ID DEPTH CLASSIFIC  |                        |        |                  |                 |            |                        |        |                |                 | -                      |
|        |                             |        | 2 1.5/3.0 SP-S<br>6 7.5/9.0 SP-S  | M*                     |        |                  |                 |            |                        |        |                |                 | -<br>-30               |
|        |                             |        | *Lab visual classification based on g<br>curve. No Atterberg limits.                            | gradation              |        |                  |                 |            |                        |        |                |                 | -                      |
|        | ORM 183                     |        |   |                        |        |                  |                 |            |                        |        |                |                 | E <sub>35</sub>        |

| DPI         | LLING                            | 100                                     | DIVISION   | INST           |         |        |                 |                                | SHEET 1           | 777     |
|-------------|----------------------------------|---|--|----------------|---------|--------|-----------------|--------------------------------|-------------------|---------|
| . PRO       |                                  | _00                                     | South Atlantic   |                |         |        |                 | strict                         | OF 2 SH           | EETS    |
|             | acksonville                      | a Hart                                  | or CPP   | 13.25          |         |        |                 | SYSTEM/DATUM HORIZONTAL        | VERTICAL          |         |
| 93          | 2727777                          | 200                                     | ER CHANNEL   | 10.            |         |        |                 | e, FLE (U.S. Ft.) NAD83        | MLLW              |         |
|             | ING DESIG                        |   | The state of the s | 11. 1          |         |        |                 |                                | UTO HAMME         | R       |
|             | B-JHPM0                          |   | X = 509,269 Y = 2,201,526  | and the second | Di      | edri   | ich D           |                                | MANUAL HAM        |         |
|             | LING AGE                         |   | ering & Testing, Inc. 2009D08  | 12. 1          | ОТА     | L S    | AMPL            | ES DISTURBED U                 | NDISTURBED        | (UD)    |
| NAM         | E OF DRILL                       | LER                                     | ering & resuing, mo.   | 13. 1          | OTA     | LN     | UMB             | ER CORE BOXES 2                |                   |         |
|             | larvin Stric                     |   |  | 14, 1          | LEV     | ATI    | ON G            | ROUND WATER TIDAL              |                   |         |
| $\boxtimes$ | CTION OF<br>VERTICAL<br>INCLINED | BORIN                                   | G DEG. FROM BEARING  | 15. 1          |         | -      |                 | STARTED                        | 01-13-1           |         |
| THIC        | KNESS OF                         | OVER                                    | BURDEN N/A   | 16.            | LEV     | ATI    | ON T            | OP OF BORING -44.3 Ft.         |                   |         |
| DEP         | TH DRILLE                        | D INTO                                  | ROCK N/A   | 17. 1          | OTA     | LR     | ECO\            | /ERY FOR BORING 93 %           |                   |         |
| TOT         | AL DEPTH                         | OE POI                                  | ALL STATE OF THE S | 18. 5          |         | 300    |                 | ND TITLE OF INSPECTOR          |                   |         |
| 101         | AL DEFTH                         | 1                                       | 19.51 t.   | 4              | _       |        | I hon           | npson III, Civil Engineer      | 7600              | m       |
| LEV.        | DEPTH                            | LEGEND                                  | CLASSIFICATION OF MATERIALS  | RÉ             | BO X OB | SAMPLE | RQD<br>OR<br>UD | REMARKS                        | BLOWS/<br>0.5 FT. | N-VALUE |
| 44.3        | 0.0                              |   |  |                |         |        |                 | -44.3                          |                   |         |
|             |                                  |   | SAND, poorly-graded, mostly angular to<br>subangular fine to medium-grained  |                |         |        |                 |                                | 2                 |         |
|             |                                  | 200                                     | sand-sized quartz, few angular shell up to   | 10             | 0       |        |                 | SPT Sampler                    | 1                 | 38.     |
| 45.7        | - 1.4                            |   | 3/4", wet, 5Y 5/1 gray (SP)  |                |         | 4      | Ш               | -45.8                          | 3                 | 4       |
|             |                                  | III<br>III<br>III                       | LIMESTONE, sandy, sparsely fossiliferous oft, moderately weathered, fine grained,  | IS,            | Ť       | -      | 1               | -1010                          | 8                 |         |
|             | _                                |   | moist, 5Y 4/3 olive  | 10             | 0 3     | 2      |                 | SPT Sampler                    | 7                 |         |
| 1           |                                  | III                                     |  |                |         |        | Ш               | -47.3                          | 9                 | 16      |
|             |                                  | ITI                                     |  | 177            | +       |        |                 | -47.3                          | 10                |         |
|             | -                                | ITI                                     |  | 10             | 0       | 3      |                 | SPT Sampler                    | 12                |         |
|             |                                  | III                                     |  | 10             | 1       | 1      |                 | No repair for                  | 10                | 22      |
|             |                                  | III                                     |  | 4              | +       | -      | ł               | -48.8                          | 7                 |         |
|             |                                  | III                                     |  | 80             |         | 1      | . 11            | SPT Sampler                    | 14                |         |
| 1           | oration Weathers                 | III                                     |  | 00             | 1       | 1      | Ш               |                                | -                 | 25      |
| - 6         | - ow                             | III                                     |  |                | +       | -      |                 | -50.3                          | 11                |         |
|             | - 9                              |   |  |                |         |        |                 |                                | 10                |         |
| à           | - Apoly                          | III                                     |  | 87             |         | 0      |                 | SPT Sampler                    | 17                | 36      |
|             | - 1                              | 111111111111111111111111111111111111111 |  | -              |         | - 20   | 1               | -51.8                          | 19                |         |
|             |                                  | III                                     |  |                |         |        |                 | Sand Street, Street            | _ 9               |         |
|             |                                  | ĪŢĪ                                     |  | 93             | 1       | 3      |                 | SPT Sampler                    | 17                | 47      |
|             |                                  |   | At El53.1 Ft., 5Y 5/1 gray   |                |         | -      |                 | -53.3                          | 30                | 1       |
| 1           |                                  | III                                     |  |                |         |        |                 |                                | 18                |         |
| 0           | -                                | III                                     |  | 10             | 0       | 7      |                 | SPT Sampler                    | 22                | 51      |
|             | -                                | ITI                                     |  |                |         |        |                 | -54.8                          | 29                | 30      |
| 8           |                                  | III<br>III                              |  | 1              |         |        | H               |                                | 9                 |         |
|             |                                  | ITI                                     | At El55.3 Ft., moderately hard, slightly weathered   | 92             | 2       | 3      |                 | SPT Sampler                    | 47                | 97+     |
|             | š                                | ITI                                     |  | 2              |         | 4      |                 | -56.1<br>-56.3 Advanced Boring | 50/0.3'           |         |
|             | - 3                              | ILI                                     |  | 10             | 0 9     |        | 1               | SPT Sampler                    | 41                |         |
|             | - #6                             | III                                     |  | 10             | ,       | 1      |                 | -57.2                          | 50/0.4'           |         |
| - 0         | Partition Weathers               |   |  |                |         |        |                 | -57.8 Advanced Boring          |                   |         |
| 1           | - 40                             | III                                     |  | 80             | 1       | 0      |                 | -58.3 SPT Sampler              | 50                |         |
|             | - 1                              | III                                     |  | 1              | T       | - 3    |                 | 00.0                           |                   |         |
|             | _                                | III                                     |  |                |         | 1      | . 11            | Advanced Boring -59.3          |                   |         |

| DRI      | LLING              | LO              | G (Cont. Sheet)  | INSTALLA*  Jackso        |       |                  |                 | <u> </u>                      | nation CD-01111                                |                   | SHEET 2<br>Of 2 SH | EETS    |                          |
|----------|--------------------|-----------------|--|--------------------------|-------|------------------|-----------------|-------------------------------|--|-------------------|--------------------|---------|--------------------------|
| PROJEC   | т                  |                 |  | COORDINA                 |       |                  |                 | UM                            | HORIZONTAL                                     |                   | TICAL              |         |                          |
| Jack     | sonville Ha        | arbor (         | GRR  | State F                  | lane, | FLE              | (U.S            | . Ft.)                        | NAD83  | i M               | LLW                |         |                          |
| LOCATION | ON COORDI          | NATE            | s  | ELEVATIO                 | N ТОР | OF B             | ORIN            | G                             |  |                   |                    |         |                          |
| X = 5    | 09,269             | Y = 2           | ,201,526   | -44.3 F                  | t.    |                  |                 | 1                             |  |                   |                    |         |                          |
| ELEV.    | DEPTH              | LEGEND          | CLASSIFICATION OF MATERIA  | ALS                      | REC.  | BOX OR<br>SAMPLE | RQD<br>OR<br>UD |                               | REMARKS  | 5                 | BLOWS/<br>0.5 FT.  | N-VALUE | -1                       |
|          | athered —          | III             |  |                          | 80    | 11               |                 | -60.8                         | SPT Samp                                       | ler               | 36<br>37<br>50     | 87      | - '<br>-<br>-<br>-<br> - |
|          | Slightly Weathered | III             |  |                          | 100   | 12               |                 | -61.2                         | SPT Samp                                       | ler               | 50/0.4'            |         | -<br>-<br><del>-</del>   |
| -62.3    | 18.0 <b>▼</b>      |                 |  |                          |       |                  |                 | -62.3                         | Advanced Bo                                    | oring             |                    |         | -<br>-<br>-              |
| 02.0     | 10.0               |                 | SAND, poorly-graded with silt, mos<br>fine-grained sand-sized quartz, mos<br>5Y 4/2 olive gray (SP-SM)   | tly<br>ist,              | 100   | 13               | -               | 02.0                          | SPT Samp                                       | ler               | 12                 | 30      | -<br>-<br>-<br>-         |
| -63.8    | 19.5               | <u> :·</u> ]  } | At El63.5 Ft., few wood debris up<br>5Y 4/2 olive gray<br>NOTES:   | to 2",                   |       |                  |                 | -63.8<br>140# ha<br>2.0' spli | ammer w/30" drop use<br>t spoon (1-3/8" I.D. x | ed with<br>2" O.D | 18                 |         | -<br>-<br>-<br>-2        |
|          |                    |                 | USACE Jacksonville is the customers original files.  | odian for                |       |                  |                 |                               |  |                   |                    |         | -<br>-<br>-<br>[         |
|          |                    |                 | Soils are field visually classified accordance with the Unified Soils Classification System.             | in                       |       |                  |                 |                               |  |                   |                    |         | -<br>-<br>-<br>-         |
|          |                    |                 | <ul><li>3. Set 55.5 ft. of 6" flush joint steel</li><li>4. Water depth recorded at start of</li></ul>    | _                        |       |                  |                 |                               |  |                   |                    |         | -<br>-<br>-              |
|          |                    |                 | operations and referenced to the tid<br>at Sister's Creek.   | dal station              |       |                  |                 |                               |  |                   |                    |         | -<br>-<br>-              |
|          |                    |                 | <ol> <li>Water depth of -45.2 ft. recorder<br/>PM on 1/13/2010. Tide gage readir<br/>ft. mllw</li> </ol> | d at 12:45<br>ng of +0.9 |       |                  |                 |                               |  |                   |                    |         | -<br>-2<br>-             |
|          |                    |                 | Additional lab test results were a February 2011   | added                    |       |                  |                 |                               |  |                   |                    |         | -<br>-<br>-              |
|          |                    |                 | 7. Laboratory Testing Results SAMPLE SAMPLE LABORA   | ATORY                    |       |                  |                 |                               |  |                   |                    |         | -<br>-<br>-<br>-         |
|          |                    |                 | ID DEPTH CLASSIFI<br><br>1 0.0/1.5 SP-S  | ICATION<br>              |       |                  |                 |                               |  |                   |                    |         | -<br>-<br>-<br>-         |
|          |                    |                 | *Lab visual classification based on curve. No Atterberg limits.  | gradation                |       |                  |                 |                               |  |                   |                    |         | -<br>-<br>-              |
|          |                    |                 |  |                          |       |                  |                 |                               |  |                   |                    |         | -<br>-3<br>-             |
|          |                    |                 |  |                          |       |                  |                 |                               |  |                   |                    |         | -<br>-<br>-<br>-         |
|          |                    |                 |  |                          |       |                  |                 |                               |  |                   |                    |         | -<br>-<br>-<br>-         |
|          |                    |                 |  |                          |       |                  |                 |                               |  |                   |                    |         | -<br>-<br>-<br>-         |
|          |                    |                 |  |                          |       |                  |                 |                               |  |                   |                    |         | -<br>-                   |
|          |                    |                 |  |                          |       |                  |                 |                               |  |                   |                    |         |                          |

| DRILLI                   | NG                           | 100               | DIVI  | SION  |   | INSTA  |                  |                    |                                      |  | SHEET 1            | 777     |
|--------------------------|------------------------------|-------------------|---|---|---|--------|------------------|--------------------|--------------------------------------|--|--------------------|---------|
|                          | 10                           | LUC               | S   | South Atlantic  |   |        |                  |                    | istrict                              |  | OF 2 SH            | EETS    |
| . PROJECT                |                              |                   | 055   |   |   | 150    |                  |                    | SYSTEM/DATUM                         | Remarks  | VENEZA             |         |
| 0.00                     |                              |                   | or GRR  | in ie.  |   | 10. C  | 2770             | THE REAL PROPERTY. |                                      | HORIZONTAL   | VERTICAL           |         |
| SI. JC                   |                              |                   | R CHAN  | LOCATION CO   | ORDINATES   | 11. M  |                  |                    | ne, FLE (U.S. Ft.) RER'S DESIGNATION | NAD83  | MLLW<br>AUTO HAMME | D       |
| CB-JH                    |                              |                   |   |   | 76 Y = 2,200,149  |        |                  |                    | 0-50 Truckrig                        |  | MANUAL HAM         |         |
| . DRILLING               |                              |                   | 12. 460   | 1   | CONTRACTOR FILE NO.   | 12. T  | OTAL             | SAMP               |                                      |  | NDISTURBED         | (UD)    |
| Challe NAME OF           |                              |                   | eering &  | Testing, Inc.   | 2009D08   |        | 0.000            | 11.01.00           | ER CORE BOXES                        | 9  | 0                  |         |
| Marvin                   | Stric                        | kland             |   |   |   | 7      | 200,000          |                    | 22.4.20.20.20.00.00.00               | 400,717  |                    |         |
| DIRECTION VERTI          | CAL                          | BORIN             | G   | DEG. FROM<br>VERTICAL   | BEARING   | 15. D. |                  | naryone<br>        | ROUND WATER                          | STARTED  | COMPLETE           | 4.0     |
| . THICKNES               |                              | OVER              | RURDEN  | N/A   |   | 723    |                  |                    | OP OF BORING                         | -43.9 Ft.  | 01-15-1            | 0       |
| . DEPTH DR               | 1000                         |                   |   | N/A   |   | 1000   |                  | 22323              | VERY FOR BORING                      | 88 %   |                    |         |
|                          |                              | 445.74            | 18100111  | u Assu As   |   | 18. S  | GNAT             | URE A              | AND TITLE OF INSPE                   | CTOR   |                    |         |
| TOTAL DE                 | ртн с                        | F BO              | RING  | 18.5 Ft.  |   |        | _                | _                  | npson III, Civil E                   | ngineer  |                    |         |
| ELEV. DEI                | тн                           | LEGEND            |   | CLASSIFICATIO   | N OF MATERIALS  | RÉC    | BOX OR<br>SAMPLE | RQD<br>OR<br>UD    |                                      | REMARKS  | BLOWS/<br>0.5 FT.  | N-VALUE |
| 43.9 0.0                 |                              |                   |   |   |   |        |                  |                    | -43.9                                |  |                    |         |
| 44.2 _ 0.3               |                              | III               | SAND,   | , silty, mostly an  | ngular to subangular<br>d sand-sized quartz,  | 100    | 1                | 00                 | -44.2                                | SPT Sampler  | 50/0.3'            |         |
| -49.4 5.5.5<br>-49.7 5.8 | Weathered Slightly Weathered |                   | little sil<br>to 3/8"<br>wet, 5'<br>LIMES<br>slightly<br>filled p | It, few angular to, trace concrete y 4/1 dark gray TONE, fossilife, weathered, find its, 5Y 5/2 olive | o subangular shell up<br>debris up to 1-3/8",<br>(SM)<br>rous, moderately hard<br>e grained, pitted, sand | 62     | BOX 2            | RQD<br>14          | -49.4<br>4 x 5-1/2"                  | Diamond Impred DT = 3 mins HP = 300 psi DFR = 20 %  Diamond Impred DT = 2 mins |                    |         |
| -52.7  8.8<br>-53.4  9.5 | SW A- Highly Weath           | III<br>III<br>TIT | SAND,   | , silty, mostly ar  | ightly weathered, solid   | 1000   | #2               | 11                 | -53.4                                | HP = 300 psi<br>DFR = 20 %   | 13                 |         |
|                          |                              | +[+[              | fine to   | medium-graine   | d sand-sized quartz,<br>c odor, 5Y 6/2 light  | 100    | 2                |                    |                                      | SPT Sampler  | 18                 |         |
| -                        |                              | [-]-              |   | ray (SM)  | o caoi, o i o/z light   | 100    | -                |                    | 500                                  | or i campier   | No.                | 36      |
|                          |                              |                   | A+ EI   | -54.9 Ft., dry  |   | 0      |                  |                    | -54.9                                |  | 18                 |         |
| E                        |                              |                   | AL EL.  | -04.9 Ft., dry  |   |        |                  |                    |                                      |  | 17                 |         |
| 8                        |                              | [+]+              |   |   |   | 100    | 3                |                    |                                      | SPT Sampler  | 24                 | EA      |
| 4-2                      |                              | 111               |   |   |   |        |                  |                    | -56.4                                |  | 30                 | 54      |
| 1                        |                              |                   |   |   |   |        |                  |                    |                                      |  | 14                 |         |
|                          |                              |                   |   |   |   | 100    | 4                |                    | 1.3                                  | SPT Sampler  | 23                 |         |
| 4                        |                              | 111               |   |   |   | 100    | 4                |                    | and the                              | or i sampler   | 1000               | 51      |
|                          |                              |                   |   |   |   | 7      |                  |                    | -57.9                                |  | 28                 |         |
| E                        |                              | 111               | 11  |   |   | 100    | 5                |                    |                                      | SPT Sampler  | 8                  |         |
| (4 <u>×</u>              |                              | 111               |   |   |   | 100    |                  |                    |                                      | Of a Campier   | 18                 |         |

| Jacksonville Harbor GRR   |          | SHEET 2           |   | g 200.g.               | iot.            |                  |          | G (Cont. Sheet)   | LO       | ILLING | DR    |
|---|----------|-------------------|---|------------------------|-----------------|------------------|----------|---|----------|--------|-------|
| State Plane, FLE (U.S. Ft.)   NAD83   MILLW   | IEE I 3  |                   | HODIZONTAL  | 1184                   |                 |                  |          | Jacks   |          |        |       |
| CLASSIFICATION OF MATERIALS   Recorded at 13:00   PM or 1/15/2010. Tide gage reading of +1.9  |          |                   | l   |                        |                 |                  |          |   | arhor (  |        |       |
| NOTES: 1. USACE Jacksonville is the custodian for these original files. 2. Soils are field visually classified in accordance with the Unified Soils Classification System. 3. Set 55.5 ft. of 6" flush joint steel casing 4. Water depth recorded at start of drilling operations and referenced to the tidal station at Sister's Creek. 5. Water depth of -45.8 ft. recorded at 13.00 PM on 1/15/2010. Tide gage reading of +1.9 PM on 1/15/2010. Tide gage reading of +1.9  |          |                   | 10.000  |                        |                 |                  |          |   |          |        |       |
| CLASSIFICATION OF MATERIALS   Rec.   Sec.            |                   |   |                        |                 |                  |          |   |          |        |       |
| 100 6 SPT Sampler 17 -60.9 24 -62.4 18.5 NOTES: 1. USACE Jacksonville is the custodian for these original files. 2. Soils are field visually classified in accordance with the Unified Soils Classification System. 3. Set 55.5 ft. of 6" flush joint steel casing 4. Water depth recorded at start of drilling operations and referenced to the tidal station at Sister's Creek. 5. Water depth of -45.8 ft. recorded at 13:00 PM on 1/15/2010. Tide gage reading of +1.9  | N-VALUE  | BLOWS/<br>0.5 FT. | REMARKS   |                        | RQD<br>OR<br>UD | BOX OR<br>SAMPLE | ĸ.       | CLASSIFICATION OF MATERIALS   | LEGEND   |        |       |
| -62.4 18.5  NOTES:  1. USACE Jacksonville is the custodian for these original files.  2. Soils are field visually classified in accordance with the Unified Soils Classification System.  3. Set 55.5 ft. of 6" flush joint steel casing 4. Water depth recorded at start of drilling operations and referenced to the tidal station at Sister's Creek.  5. Water depth of -45.8 ft. recorded at 13:00 PM on 1/15/2010. Tide gage reading of +1.9   | 41       | 23                | SPT Sampler   | -59.4                  |                 | 5                | 100      |   | HH       |        |       |
| -62.4 18.5  NOTES:  1. USACE Jacksonville is the custodian for these original files.  2. Soils are field visually classified in accordance with the Unified Soils Classification System.  3. Set 55.5 ft. of 6" flush joint steel casing  4. Water depth recorded at start of drilling operations and referenced to the tidal station at Sister's Creek.  5. Water depth of -45.8 ft. recorded at 13:00 PM on 1/15/2010. Tide gage reading of +1.9  |          | 10                | <u> </u>  | 00.4                   |                 |                  |          |   |          |        |       |
| -62.4 18.5  NOTES:  1. USACE Jacksonville is the custodian for these original files.  2. Soils are field visually classified in accordance with the Unified Soils Classification System.  3. Set 55.5 ft. of 6" flush joint steel casing  4. Water depth recorded at start of drilling operations and referenced to the tidal station at Sister's Creek.  5. Water depth of -45.8 ft. recorded at 13:00 PM on 1/15/2010. Tide gage reading of +1.9  | 1        | 17                | SPT Sampler   |                        |                 | 6                | 100      |   |          |        |       |
| -62.4 18.5  NOTES: 1. USACE Jacksonville is the custodian for these original files. 2. Soils are field visually classified in accordance with the Unified Soils Classification System. 3. Set 55.5 ft. of 6" flush joint steel casing 4. Water depth recorded at start of drilling operations and referenced to the tidal station at Sister's Creek. 5. Water depth of -45.8 ft. recorded at 13:00 PM on 1/15/2010. Tide gage reading of +1.9   | 41       | -                 | ·   | -60 Q                  |                 |                  |          |   | <b> </b> |        |       |
| NOTES:  1. USACE Jacksonville is the custodian for these original files.  2. Soils are field visually classified in accordance with the Unified Soils Classification System.  3. Set 55.5 ft. of 6" flush joint steel casing  4. Water depth recorded at start of drilling operations and referenced to the tidal station at Sister's Creek.  5. Water depth of -45.8 ft. recorded at 13:00 PM on 1/15/2010. Tide gage reading of +1.9  | +        | _                 |   | -00.9                  |                 |                  |          |   | <b> </b> |        |       |
| -62.4 18.5 NOTES:  1. USACE Jacksonville is the custodian for these original files.  2. Soils are field visually classified in accordance with the Unified Soils Classification System.  3. Set 55.5 ft. of 6" flush joint steel casing  4. Water depth recorded at start of drilling operations and referenced to the tidal station at Sister's Creek.  5. Water depth of -45.8 ft. recorded at 13:00 PM on 1/15/2010. Tide gage reading of +1.9   | †        |                   | SPT Sampler   |                        |                 | 7                | 100      |   | <b> </b> |        |       |
| NOTES:  1. USACE Jacksonville is the custodian for these original files.  2. Soils are field visually classified in accordance with the Unified Soils Classification System.  3. Set 55.5 ft. of 6" flush joint steel casing  4. Water depth recorded at start of drilling operations and referenced to the tidal station at Sister's Creek.  5. Water depth of -45.8 ft. recorded at 13:00 PM on 1/15/2010. Tide gage reading of +1.9  | 45       |                   | or r campion  | 00.4                   |                 |                  |          |   | <b> </b> | 40.5   | 00.4  |
| 1. USACE Jacksonville is the custodian for these original files.  2. Soils are field visually classified in accordance with the Unified Soils Classification System.  3. Set 55.5 ft. of 6" flush joint steel casing  4. Water depth recorded at start of drilling operations and referenced to the tidal station at Sister's Creek.  5. Water depth of -45.8 ft. recorded at 13:00 PM on 1/15/2010. Tide gage reading of +1.9  | +        |                   |   |                        |                 |                  | $\vdash$ |   |          | 18.5   | -62.4 |
| 1. USACE Jacksonville is the custodian for these original files.  2. Soils are field visually classified in accordance with the Unified Soils Classification System.  3. Set 55.5 ft. of 6" flush joint steel casing  4. Water depth recorded at start of drilling operations and referenced to the tidal station at Sister's Creek.  5. Water depth of -45.8 ft. recorded at 13:00 PM on 1/15/2010. Tide gage reading of +1.9  |          | າ<br>ວ.).         | mer w/30" drop used with poon (1-3/8" I.D. x 2" O.I | 140# hai<br>2.0' split |                 |                  |          | NOTES:  |          |        |       |
| 2. Soils are field visually classified in accordance with the Unified Soils Classification System.  3. Set 55.5 ft. of 6" flush joint steel casing  4. Water depth recorded at start of drilling operations and referenced to the tidal station at Sister's Creek.  5. Water depth of -45.8 ft. recorded at 13:00 PM on 1/15/2010. Tide gage reading of +1.9  |          | /-                | ons:  | Abbrevia               |                 |                  |          |   |          |        |       |
| accordance with the Unified Soils Classification System.  3. Set 55.5 ft. of 6" flush joint steel casing  4. Water depth recorded at start of drilling operations and referenced to the tidal station at Sister's Creek.  5. Water depth of -45.8 ft. recorded at 13:00 PM on 1/15/2010. Tide gage reading of +1.9  |          |                   | ydraulic Pressure.                                  | HP =                   |                 |                  |          | Soils are field visually classified in  |          |        |       |
| 4. Water depth recorded at start of drilling operations and referenced to the tidal station at Sister's Creek.  5. Water depth of -45.8 ft. recorded at 13:00 PM on 1/15/2010. Tide gage reading of +1.9  |          |                   | Drill Fluid Return.                                 | DFR =                  |                 |                  |          | accordance with the Unified Soils   |          |        |       |
| at Sister's Creek.  5. Water depth of -45.8 ft. recorded at 13:00 PM on 1/15/2010. Tide gage reading of +1.9  |          |                   |   |                        |                 |                  |          |   |          |        |       |
| PM on 1/15/2010. Tide gage reading of +1.9  |          |                   |   |                        |                 |                  |          | <ol> <li>Water depth recorded at start of drilling<br/>operations and referenced to the tidal station<br/>at Sister's Creek.</li> </ol> |          |        |       |
|   |          |                   |   |                        |                 |                  |          | PM on 1/15/2010. Tide gage reading of +1.9  |          |        |       |
|   |          |                   |   |                        |                 |                  |          | it. iiiiw   |          |        |       |
|   |          |                   |   |                        |                 |                  |          |   |          |        |       |
|   |          |                   |   |                        |                 |                  |          |   |          |        |       |
|   |          |                   |   |                        |                 |                  |          |   |          |        |       |
|   |          |                   |   |                        |                 |                  |          |   |          |        |       |
|   |          |                   |   |                        |                 |                  |          |   |          |        |       |
|   |          |                   |   |                        |                 |                  |          |   |          |        |       |
|   |          |                   |   |                        |                 |                  |          |   |          |        |       |
|   |          |                   |   |                        |                 |                  |          |   |          |        |       |
|   | <b> </b> |                   |   |                        |                 |                  |          |   |          |        |       |
|   |          |                   |   |                        |                 |                  |          |   |          |        |       |
|   |          |                   |   |                        |                 |                  |          |   |          |        |       |
|   |          |                   |   |                        |                 |                  |          |   |          |        |       |
|   |          |                   |   |                        |                 |                  |          |   |          |        |       |
|   |          |                   |   |                        |                 |                  |          |   |          |        |       |
|   |          |                   |   |                        |                 |                  |          |   |          |        |       |
|   |          |                   |   |                        |                 |                  |          |   |          |        |       |
|   |          |                   |   |                        |                 |                  |          |   |          |        |       |
|   |          |                   |   |                        |                 |                  |          |   |          |        |       |
|   |          |                   |   |                        |                 |                  |          |   |          |        |       |
|   |          |                   |   |                        |                 |                  |          |   |          |        |       |

| DDI      | LLING               | 100                      | DIVISION   | INSTA         |                  |                 |   | SHEET 1           | 7.7.5   |
|----------|---------------------|--------------------------|--|---------------|------------------|-----------------|---|-------------------|---------|
|          |                     | _00                      | South Atlantic   |               | _                | ville D         |   | OF 2 SH           | EETS    |
| . PRO    | JECT<br>acksonville |                          | or CDD   | 1300          | 77               |                 | SYSTEM/DATUM HORIZONTAL                   | VERTICAL          |         |
| 100      |                     |                          | OF GRR<br>ER CHANNEL   | 10. 0         | 2770             | Lead of the     | ne, FLE (U.S. Ft.) NAD83                  | MLLW              |         |
|          | NG DESIG            |                          | A STATE OF THE PROPERTY OF THE STATE OF THE  | 11. M         |                  |                 |   | AUTO HAMME        | R       |
|          | B-JHPM09            |                          | X = 512,584 Y = 2,198,802  |               | Diec             | Irich D         | 0-50 Truckrig                             | MANUAL HAN        | MER     |
|          | LING AGEN           |                          | ering & Testing, Inc. 2009D08  | 12. T         | OTAL             | SAMPI           | LES DISTURBED U                           | O 0               | (UD)    |
| NAM      | E OF DRILL          | ER                       | oring a rooming, man   | 13. T         | OTAL             | NUMB            | ER CORE BOXES 1                           |                   |         |
|          | CTION OF            |                          | G DEG. FROM BEARING  | 14. El        | EVA              | TON G           | ROUND WATER TIDAL                         |                   |         |
| $\times$ | ERTICAL<br>NCLINED  | BOKIN                    | G DEG. FROM BEARING VERTICAL   | 15. D         | ATE B            | ORING           | STARTED 01-12-10                          | 01-12-1           | 100     |
| THIC     | KNESS OF            | OVER                     | BURDEN N/A   | 16. E         | LEVAT            | TION T          | OP OF BORING -43.5 Ft.                    |                   |         |
| DEPT     | TH DRILLE           | INTO                     | ROCK N/A   | 1,500,000,000 | Part and         | 1000            | VERY FOR BORING 92 %                      |                   |         |
| тот      | AL DEPTH O          | OF BOI                   | RING 21.0 Ft.  | 18. SI        |                  |                 | npson III, Civil Engineer                 |                   |         |
|          |                     | •                        |  | -             | _                | _               | npoor 111, Civil Engineer                 | ĭō.*              | Ä       |
| LEV.     | DEPTH               | LEGEND                   | CLASSIFICATION OF MATERIALS  | RÉC           | BOX OR<br>SAMPLE | ROD<br>OR<br>UD | REMARKS                                   | BLOWS/<br>0.5 FT. | N-VALUE |
| 43.5     | 0.0                 |                          |  |               |                  |                 | -43.5                                     |                   |         |
|          |                     | 111                      | SAND, silty, mostly angular to subangular<br>medium to coarse-grained sand-sized   |               |                  |                 |   | 9                 |         |
|          |                     | 1+1+                     | quartz, few angular shell up to 1/4", few silt,  | 73            | 1                |                 | SPT Sampler                               | 13                | -00     |
| 45.0     | 1.5                 | 111                      | wet, 2.5Y 6/2 light brownish gray (SM)   |               |                  |                 | -45.0                                     | 15                | 28      |
|          |                     | ITI                      | LIMESTONE, sandy, sparsely fossiliferous,  | 7             |                  |                 | -1419                                     | 13                |         |
|          |                     | III<br>III               | very soft, slightly weathered, fine grained,<br>moist, 5Y 7/2 light gray   | 80            | 2                |                 | SPT Sampler                               | 19                |         |
|          |                     | I,I<br>I,I               |  | 100           | 77               |                 | 3, 11, 12, 12, 12                         | 25                | 44      |
|          | -                   | III                      |  | 0             |                  | 1               | -46.5                                     | 11                |         |
|          |                     | III<br>TIT               |  | 73            | 3                |                 | SPT Sampler                               | 19                |         |
|          |                     | III                      | At El47.5 Ft., moderately hard, slightly   | 13            | 3                |                 | A Section 1 and 1 and 1 and 1 and 1 and 1 | 35                | 54      |
|          | - 1                 | III                      | weathered  | 4             |                  |                 | -48.0                                     |                   |         |
|          | - #8                | III                      |  | 89            | 4                |                 | SPT Sampler                               | 35<br>50/0.4'     |         |
|          | * *                 | III                      |  | Ÿ             |                  |                 | -48.9 Advanced Boring                     |                   |         |
|          |                     | ITI                      |  | 0             |                  |                 | -49.5 Advanced Boring                     | 7.70              |         |
|          | Weat                | ITI                      |  | line from     |                  |                 | SET OF STREET                             | 10                |         |
|          | -                   | ITI                      |  | 100           | 5                |                 | SPT Sampler                               | 24                | 36      |
|          | - <del>I</del>      | III<br>III               |  | 1/2.24        |                  |                 | -51.0                                     | 12                |         |
|          |                     | III                      |  | 100           | 6                |                 | -51.4 SPT Sampler                         | 50/0.4'           |         |
|          |                     | III                      |  |               |                  |                 | Advanced Boring                           | 1                 |         |
|          |                     | III                      |  | 1             |                  |                 | -52.5                                     | 7                 |         |
|          | •                   | III<br>III<br>III<br>III | At El52.5 Ft., soft, highly weathered  |               |                  |                 |   | 20                |         |
| - 6      | - P                 | III                      |  | 100           | 7                |                 | SPT Sampler                               | 15                | 27      |
|          | Highly Weathered    | III<br>III<br>III        |  |               |                  |                 | -54.0                                     | 22                | 37      |
|          | × ×                 | III                      |  | 1             |                  |                 |   | 28                |         |
|          | - £                 | ITI                      |  | 100           | 8                |                 | SPT Sampler                               | 34                | 2.2     |
| 55.5     | 12.0                | III<br>III               |  | 300           |                  |                 | -55.5                                     | 46                | 80      |
| 55.5     | 12.0                |                          | SAND, poorly-graded, mostly angular to   |               |                  |                 | -00.0                                     | 6                 |         |
|          |                     | • : :                    | subangular fine to medium-grained<br>sand-sized quartz, moist, 5Y 6/1 gray (SP)  | 100           | 9                |                 | SPT Sampler                               | 19                | ž.      |
|          |                     |                          | Sand Sized quality, moist, or orr gray (OF)  | 100           | 3                |                 | 400                                       | 29                | 48      |
| 57.0     | 13.5                | :111                     | SAND, poorly-graded with silt, mostly  |               |                  |                 | -57.0                                     |                   |         |
|          |                     |                          | angular to subangular fine-grained   | 80            | 10               |                 | SPT Sampler                               | 28                |         |
|          |                     |                          | sand-sized quartz, few silt, moist,<br>5Y 5/2 olive gray (SP-SM)   | 4             |                  |                 | -58.0                                     | 50                |         |
| - 1      |                     | :11                      | A STATE OF THE STA |               |                  |                 | -58.5 Advanced Boring                     | ]                 | -       |

| DRI      | LLING       | LOC            | G (Cont. Sheet)   | Jackson   |     |                  |                 | <u> </u>  | nation ob orn iv                              |        | SHEET<br>OF 2     | 2<br>SHEETS     | <u>.</u> |
|----------|-------------|----------------|---|-----------|-----|------------------|-----------------|-----------|---|--------|-------------------|-----------------|----------|
| PROJEC   | <br>:Т      |                |   | COORDINA  |     |                  |                 | UM        | HORIZONTAL                                    | VER    | TICAL             |                 | 1        |
|          | sonville Ha | arbor (        | GRR   | State P   |     |                  |                 |           | NAD83   | ı      | ИLLW              |                 |          |
| LOCATION | ON COORDI   | NATES          | 6   | ELEVATION |     |                  |                 |           | •   | •      |                   |                 | 1        |
| X = 5    | 512,584     | Y = 2          | ,198,802  | -43.5 F   | t.  |                  |                 |           |   |        |                   |                 |          |
| ELEV.    | DEPTH       | LEGEND         | CLASSIFICATION OF MATERIAL  | LS        | ĸč. | BOX OR<br>SAMPLE | RQD<br>OR<br>UD |           | REMARKS                                       |        | BLOWS/<br>0.5 FT. | N-VALUE         |          |
|          |             | [·:+:]         |   |           |     |                  |                 |           |   |        | 9                 |                 | Ŧ        |
|          |             | :-             |   |           | 93  | 11               |                 |           | SPT Sample                                    | er     | 10                | T               | F        |
|          |             | <b> </b> ::    |   |           |     |                  |                 | -60.0     |   |        | 12                | 22              | F        |
|          |             | <b> </b> [::   |   |           |     |                  | 1               | 00.0      |   |        | 7                 |                 | ‡        |
|          |             | <b> </b>       |   |           | 100 | 12               |                 |           | SPT Sample                                    | er     | 8                 | $\neg$          | F        |
|          |             | ::             |   |           |     |                  |                 | 04.5      | 5 55 <b>.</b>                                 |        | 7                 | 15              | Ŀ        |
|          |             | <b> </b> -:    |   |           |     |                  |                 | -61.5     |   |        | 3                 | +               | ŧ        |
|          |             | <b> </b> [::]] |   |           | 100 | 13               |                 |           | SPT Sample                                    | or     | 6                 | $\dashv$        | Ŀ        |
|          |             | <b> </b> :∃}   |   |           | 100 | 13               |                 |           | SFT Sampi                                     | 51     | 9                 | 15              | H        |
|          |             | :-             |   |           |     |                  |                 | -63.0     |   |        |                   | +               | Ŧ        |
|          |             | <b> -:</b>     |   |           |     | ١                |                 |           | 227.0   |        | 8                 | _               | F        |
|          |             | [::]]}         |   |           | 100 | 14               |                 |           | SPT Sample                                    | er     | 12                | <del>−</del> 33 | ţ        |
| -64.5    | 21.0        | .  -           |   |           |     |                  |                 | -64.5     |   |        | 21                |                 | 丰        |
|          |             |                | NOTES:  |           |     |                  |                 | 140# ha   | mmer w/30" drop use<br>spoon (1-3/8" I.D. x 2 | d witl | n .               |                 | ţ        |
|          |             |                | USACE Jacksonville is the custo these original files.     Soils are field visually classified i accordance with the Unified Soils |           |     |                  |                 | 2.0 00.00 | (   |        | 2.).              |                 |          |
|          |             |                | Classification System.  3. Set 55.5 ft. of 6" flush joint steel   | casing    |     |                  |                 |           |   |        |                   |                 | Ł        |
|          |             |                | Water depth recorded at start of operations and referenced to the tid.  | drilling  |     |                  |                 |           |   |        |                   |                 | E        |
|          |             |                | at Sister's Creek.  5. Water depth of -46.5 ft. recorded  |           |     |                  |                 |           |   |        |                   |                 | ŧ        |
|          |             |                | AM on 1/12/2010. Tide gage reading ft. mllw   | g of +3.0 |     |                  |                 |           |   |        |                   |                 | E        |
|          |             |                | 6. Laboratory Testing Results   |           |     |                  |                 |           |   |        |                   |                 | F        |
|          |             |                | SAMPLE SAMPLE LABORA ID DEPTH CLASSIFIC   |           |     |                  |                 |           |   |        |                   |                 | F        |
|          |             |                | 1 0.0/1.5 SM  | *         |     |                  |                 |           |   |        |                   |                 | F        |
|          |             |                | *Lab visual classification based on g   |           |     |                  |                 |           |   |        |                   |                 | F        |
|          |             |                | curve. No Atterberg limits.   | gradation |     |                  |                 |           |   |        |                   |                 | F        |
|          |             |                |   |           |     |                  |                 |           |   |        |                   |                 | F        |
|          |             |                |   |           |     |                  |                 |           |   |        |                   |                 | ţ        |
|          |             |                |   |           |     |                  |                 |           |   |        |                   |                 | Ļ        |
|          |             |                |   |           |     |                  |                 |           |   |        |                   |                 | ţ        |
|          |             |                |   |           |     |                  |                 |           |   |        |                   |                 | Ł        |
|          |             |                |   |           |     |                  |                 |           |   |        |                   |                 | ŀ        |
|          |             |                |   |           |     |                  |                 |           |   |        |                   |                 | E        |
|          |             |                |   |           |     |                  |                 |           |   |        |                   |                 | F        |
|          |             |                |   |           |     |                  |                 |           |   |        |                   |                 | F        |
|          |             |                |   |           |     |                  |                 |           |   |        |                   |                 | F        |
|          |             |                |   |           |     |                  |                 |           |   |        |                   |                 | ţ        |
| LEC      | ORM 183     | ⊥<br>6-∆       |   |           |     |                  | <u> </u>        |           |   |        |                   |                 | _        |

| DPII     | LING                                    | LOG                                    | DIVISION   | INSTA         |                  |                 |   | SHEET 1           | 7.7.7   |
|----------|---|--|--|---------------|------------------|-----------------|---|-------------------|---------|
| PROJ     | 40.00                                   | -00                                    | South Atlantic   |               | _                | ville D         |   | OF 2 SH           | EETS    |
|          | <b>ECT</b><br>cksonville                | o Line                                 | or CDP   | 150           | 77.00            |                 | See Remarks System/datum Horizontal                                   | VERTICAL          |         |
| 0.5      | 400000000000000000000000000000000000000 |  | R CHANNEL  | 10. 0         |                  | Transfer of     | ne, FLE (U.S. Ft.) NAD83  | MLLW              |         |
|          | NG DESIG                                |  | The second secon | 11. M         |                  |                 |   | AUTO HAMME        | R       |
|          | 3-JHPMO                                 |  | X = 514,028 Y = 2,198,355  |               | Diec             | Irich D         |   | MANUAL HAM        |         |
|          | ING AGEN                                |  | contractor file no.<br>ering & Testing, Inc. 2009D08   | 12. T         | TAL              | SAMPI           | LES DISTURBED (   | JNDISTURBED<br>0  | (UD)    |
|          | OF DRILL                                |  | Sing & results, inc.   Leebse  | 13. T         | OTAL             | NUMB            | ER CORE BOXES 1   |                   |         |
|          | arvin Stric                             |  |  | 14. E         | EVAT             | TON G           | ROUND WATER TIDAL   |                   |         |
| × v      | ERTICAL<br>ICLINED                      | BORING                                 | DEG. FROM BEARING VERTICAL   | 15. D         | ATE B            | ORING           | STARTED 08-29-09  | 08-29-0           |         |
| THICH    | (NESS OF                                | OVERB                                  | URDEN N/A  | 16. E         | LEVAT            | TION T          | OP OF BORING -48.2 Ft.  |                   |         |
| DEPT     | H DRILLE                                | DINTO                                  | ROCK N/A   | 1,9000, 11,00 | ALC: N           | 1000            | VERY FOR BORING 80 %  |                   |         |
| TOTA     | L DEPTH                                 | OF BOR                                 | ING 12.3 Ft.   | 18. S         |                  |                 | AND TITLE OF INSPECTOR  |                   |         |
| 1        |   | T                                      | 12.011.  | -             | _                | _               | npson III, Civil Engineer   | · ·               | ш       |
| LEV.     | DEPTH                                   | LEGEND                                 | CLASSIFICATION OF MATERIALS  | RÉC           | BOX OR<br>SAMPLE | RQD<br>OR<br>UD | REMARKS   | BLOWS/<br>0.5 FT. | N-VALUE |
| 48.2     | 0.0                                     |  | Land Committee Carlo   |               |                  |                 | -48.2   |                   |         |
|          |   | 1111                                   | SAND, silty, mostly subangular fine to<br>medium-grained sand-sized quartz, some   |               | H                |                 |   | 4                 |         |
| E        |   | 1+1+                                   | silt, little angular to subangular shell up to 1"  | , 33          | 1                |                 | SPT Sampler   | 1                 | 18      |
| -        |   | +1+1                                   | few limestone up to 2", wet, 5Y 2.5/1 black (SM)   |               |                  |                 | -49.7   | 3                 | 4       |
| -        |   |  | At El49.7 Ft., trace angular to subangular   | 1             |                  |                 | 10.7  | 7                 |         |
| 1        |   | 1111                                   | shell up to 1/4"   | 80            | 2                |                 | SPT Sampler   | 17                |         |
| -        |   | 1111                                   |  | 1             | 32               |                 | -51.2   | 26                | 43      |
| E        | 3                                       |  | At El51.2 Ft., discontinue limestone, moist  | V -           |                  | 1               | -01.2   | 7                 |         |
| Ė        |   | Ittl                                   | organic odor, 10Y 3/1 very dark greenish gray  | 87            | 3                |                 | SPT Sampler   | 10                |         |
| E        | •                                       |  | <b>5</b> -,  |               |                  |                 | The separate care   | 16                | 26      |
| Ė        |   | 11111                                  | At El52.7 Ft., discontinue shell   | 4             |                  |                 | -52.7   | 12                |         |
|          | -11                                     | 11111                                  |  | 87            | 4                |                 | SPT Sampler   | 14                |         |
| E        |   | 11111                                  |  | 01            | 7                |                 | 200   | 11                | 25      |
| -        | 40                                      | 11-11-1                                |  | 9             |                  |                 | -54.2   | 4                 |         |
| -        |   | 1111                                   |  | 400           | -                |                 | ODT O-males   | -                 |         |
| -        | 8                                       | 11-11-1                                |  | 100           | 5                |                 | SPT Sampler   | 5                 | 13      |
| -        |   | 111                                    |  | -             | -                |                 | -55.7   | 7                 |         |
| F        |   |  |  | 07            |                  |                 | ODT O   |                   |         |
| F        |   | ţţţţ                                   |  | 87            | 6                |                 | SPT Sampler   | 8                 | 16      |
|          |   | 111                                    |  | 5             |                  |                 | -57.2   | 8                 |         |
| E        |   | 1111                                   |  | (5)           | 2                |                 | 2022 - W.   | _ 2               |         |
| Ė        |   | +‡+‡                                   |  | 93            | 7                |                 | SPT Sampler   | 3                 | 9       |
| Ė        |   | 1111                                   |  |               |                  |                 | -58.7   | 6                 | 100     |
|          |   | +‡+‡                                   |  | 1.            |                  |                 | 30.777.   | 10                |         |
| 59.7     | 11.5                                    | ŢŢŢŢŢŢŢŢŢŢŢŢŢŢŢŢŢŢŢŢŢŢŢŢŢŢŢŢŢŢŢŢŢŢŢŢŢŢ | I MECTONE and a second for the   | 80            | 8                |                 | SPT Sampler   | 25                | 58      |
| <u>-</u> | 100 NS                                  | III<br>III                             | LIMESTONE, sandy, sparsely fossiliferous, moderately hard, slightly weathered, fine  |               |                  |                 | -60.2   | 33                | 195     |
| 60.5     | 12.3                                    | TIT                                    | grained, moist, 5GY 6/1 greenish gray  | 67            | 9                |                 | -60.5 SPT Sampler   | 50/0.3'           |         |
|          |   |  | NOTES:  1. USACE Jacksonville is the custodian for   |               |                  |                 | 140# hammer w/30" drop used v<br>2.0' split spoon (1-3/8" I.D. x 2" ( | vith<br>O.D.).    |         |
|          |   |  | these original files.  2. Soils are field visually classified in   |               |                  |                 | 6775  |                   |         |

|                     | G (Cont Shoot)   | INSTALLA   |     |                  |                 | g Designation CB-JHPM0                          | SHEET 2           | !       |
|---------------------|--|--|-----|------------------|-----------------|---|-------------------|---------|
|                     | G (Cont. Sheet)  | Jackso   |     |                  |                 |   | OF 2 S            | HEETS   |
| ROJECT              | CDD  | COORDINA   |     |                  |                 | 1   | MLLW              |         |
| Jacksonville Harbor |  | State P  |     |                  |                 | _ <u>'                                     </u> | IVILLVV           |         |
|                     | 2,198,355  | -48.2 F  |     | 0. 5             | Oknie           | •   |                   |         |
| ELEV. DEPTH         |  | LS   | ĸč. | BOX OR<br>SAMPLE | RQD<br>OR<br>UD | REMARKS   | BLOWS/<br>0.5 FT. | N-VALUE |
| AJ FORM 1836-A      | accordance with the Unified Soils Classification System.  3. Set 56.5 ft. of 4" flush joint steel 4. Water depth recorded at start of operations and referenced to the tid at the Mayport Bar Pilots Dock.  5. Water depth of -50.0 ft. recorded PM on 8/29/09. Tide gage reading or milw  6. Laboratory Testing Results  SAMPLE SAMPLE LABORA ID DEPTH CLASSIFIC  2 1.5/3.0 SM  *Lab visual classification based on grown. No Atterberg limits. | drilling al station  I at 12:05 of +1.8 ft.  TORY CATION |     |                  |                 |   |                   |         |

| DRILLING        | OG         | DIVISION   | INSTAL            | LATI             | ON              |                    |                     | SHEET 1           | 0.0     |
|-----------------|------------|--|-------------------|------------------|-----------------|--------------------|---------------------|-------------------|---------|
| . PROJECT       | _56        | South Atlantic   | 1000              |                  | ille D          |                    | Barrier Comment     | OF 2 SH           | EETS    |
| Jacksonville    | Harba      | or GRR   | 120               | 1000             | 200             | SYSTEM/DATUM       | Remarks             | VERTICAL          |         |
| ST. JOHN'S      | 0.00       |  |                   |                  |                 | ne, FLE (U.S. Ft.) | NAD83               | MLLW              |         |
| . BORING DESIGN |            | VIC - T-12 - MV - P-1 -  |                   |                  |                 | RER'S DESIGNATION  |                     | UTO HAMME         | R       |
| CB-JHPM09       |            | X = 516,172 Y = 2,199,461  |                   | Died             | rich D          | 0-50 Truckrig      | ⊠ M                 | ANUAL HAM         | MER     |
| Challange E     |            | contractor file no.<br>ering & Testing, Inc. 2009D08   | 12. TO            | TAL              | SAMPI           |                    |                     | O O               | (UD)    |
| . NAME OF DRILL |            | ing & resung, mc. ; 2009000  | 13. TO            | TAL              | NUMB            | ER CORE BOXES      | 1                   | U                 |         |
| Marvin Strick   | 11.0       |  | 14. EL            | EVAT             | ION G           | ROUND WATER        | TIDAL               |                   |         |
| DIRECTION OF E  | ORING      | DEG. FROM BEARING VERTICAL   |                   |                  | on the second   | 0.00-0.75-0.000    | STARTED             | COMPLETE          | D       |
| INCLINED        |            |  | 15. DA            | TE B             | ORING           |                    | 08-25-09            | 08-25-0           | 9       |
| . THICKNESS OF  | OVERB      | URDEN N/A  | 16. EL            | EVAT             | ION T           | OP OF BORING       | -40.6 Ft.           |                   | 5       |
| . DEPTH DRILLED | INTO       | ROCK N/A   | , 9030 July Child | 45.500           | 1000            | ERY FOR BORING     | 88 %                |                   |         |
| . TOTAL DEPTH O | E BODI     | ING 21.0 Ft.   | 18. SI            |                  |                 | ND TITLE OF INSPI  |                     |                   |         |
| . TOTAL DEPTH O |            | 21.011.  |                   | _                | _               | npson III, Civil E | ngineer             | -                 | m       |
| ELEV. DEPTH     | LEGEND     | CLASSIFICATION OF MATERIALS  | RÉC.              | BOX OR<br>SAMPLE | ROD<br>OR<br>UD |                    | REMARKS             | BLOWS/<br>0.5 FT. | N-VALUE |
| 40.6 0.0        |            |  |                   |                  |                 | -40.6              |                     |                   |         |
| - 5.0           | 36.5       | SAND, poorly-graded, mostly angular to   | 200               |                  |                 | 10.0               |                     | 0                 |         |
|                 |            | subangular fine to medium-grained<br>sand-sized quartz, trace angular to   | 60                | 1                |                 | Leg 15             | SPT Sampler         | 0                 |         |
|                 |            | subangular shell up to 1/8", wet, 5Y 5/4 olive   |                   |                  |                 | 40.4               |                     | 0                 | 0       |
| E               |            | (SP)   | -                 |                  | 1               | -42.1              |                     | 3                 |         |
| P I             |            |  | 60                | 2                |                 |                    | CDT Complex         | -                 |         |
| -               |            |  | 00                | 2                |                 |                    | SPT Sampler         | 5                 | 17      |
|                 |            | -At El43.6 Ft., 2.5Y 6/3 light yellowish   |                   |                  |                 | -43.6              |                     | 12                |         |
| -               |            | brown  | 100               |                  |                 |                    |                     | 16                |         |
| 1               | ::::       |  | 73                | 3                |                 |                    | SPT Sampler         | - 8               | 14      |
| E .             |            |  | 4                 |                  |                 | -45.1              |                     | 6                 | 80      |
| Ł               |            | AND AND AND ADDRESS OF THE PARTY OF THE PART | 162               |                  |                 |                    |                     | 15                |         |
| E               | ` ` `      | At El45.6 Ft., few angular to subangular shell up to 3/8", trace limestone up to 1/2",   | 73                | 4                |                 |                    | SPT Sampler         | 24                | 44      |
| 4               |            | 5Y 5/2 olive gray  |                   |                  |                 | -46.6              |                     | 20                | 44      |
| 47.1 6.5        |            |  |                   |                  |                 |                    |                     | 6                 |         |
| - 1             |            | SAND, poorly-graded with silt, mostly<br>angular to subangular fine to   | 93                | 5                |                 | 1                  | SPT Sampler         | 11                |         |
|                 | :-[[]      | medium-grained sand-sized quartz, few silt,  | l l               |                  |                 | -48.1              |                     | 14                | 25      |
|                 | .:         | moist, 5Y 3/2 dark olive gray (SP-SM)  |                   | 3                |                 |                    |                     | 8                 |         |
| F               | $[\cdot]]$ |  | 100               | 6                |                 | 14.                | SPT Sampler         | 14                | 3       |
| 49.6 9.0        | ::         |  |                   |                  |                 | -49.6              | and a second second | 20                | 34      |
| - 3.0           | 1111       | SAND, silty, mostly angular to subangular  |                   |                  |                 | -10.0              |                     | 3                 |         |
| ) <u>-</u>      | +[+]       | fine-grained sand-sized quartz, little silt,<br>moist, 5Y 3/2 dark olive gray (SM)   | 100               | 7                |                 | W 6.               | SPT Sampler         | 3                 |         |
| F               |            | At El50.6 Ft., few angular to subangular   | ,00               |                  |                 | 54.4               | a, , campion        | 14                | 17      |
| 1               |            | shell up to 3/8"<br>-At El51.1 Ft., discontinue shell,   |                   | -                |                 | -51.1              |                     | 17                |         |
| (=)             |            | 5Y 4/2 olive gray  | 400               | 0                |                 |                    | CDT Camples         | -                 | 4.1     |
| F               | ####       |  | 100               | 8                |                 |                    | SPT Sampler         | 18                | 42      |
| 4               | [ <b>!</b> |  |                   |                  |                 | -52.6              |                     | 24                |         |
| 1               | 111        |  | 100               | 9                |                 |                    | SPT Sampler         | 14                |         |
| E               | Į į į į    |  |                   |                  |                 | -53.5              | and the state of    | 50/0.4'           |         |
| -54.1 13.5      | 1111       | Tarage and the same and  |                   |                  |                 | -54.1              | Advanced Boring     |                   |         |
| - 60            | III        | LIMESTONE, sandy, non-fossiliferous,<br>moderately hard, moderately weathered, fine  | 100               | 10               |                 | -54.5              | SPT Sampler         | 50/0.4'           |         |
| Mod. Wea        | III<br>III | grained, 5Y 7/2 light gray   | *                 |                  |                 |                    | Advanced Boring     |                   |         |
| _ ∞             | ITI        |  |                   |                  |                 | -55.6              | Availoed Boiling    |                   |         |

SAJ FORM 1836 JUN 02

|            |                          |  | Jackso   | nville  | Distr   | ict  |   |   | OF 2 5   | SHEETS  |
|------------|--------------------------|--|--|---|---|--|---|---|--|---|
| •          |                          |  | COORDINA   |   |   |  | UM  | HORIZONTAL  | VERTICAL   |   |
| onville Ha | arbor C                  | GRR  | State F  | Plane,  | FLE   | (U.S   | Ft.)  | NAD83   | MLLW   |   |
| N COORDI   | NATES                    | •  | ELEVATIO   | N ТОР   | OF B  | ORIN   | G   |   |  |   |
| 16,172     |                          | 199,461  | -40.6 F  | t.  |   |  |   |   |  |   |
| DEPTH      | LEGEND                   | CLASSIFICATION OF MATER  | IALS   | REC.  | BOX OR<br>SAMPLE  | RQD<br>OR<br>UD  |   | REMARKS   | BLOWS/<br>0.5 FT.  | N-VALUE   |
| I. Wea.    | III<br>III<br>III        |  |  | 87  | 11  |  | -56.4   | SPT Sample  | er 49<br>50/0.   | 3'  |
| 16.5       | III                      |  |  |   |   |  | -57 1   | Advanced Bo   | ring   |   |
|            |                          | CLAY, fat, medium plasticity, firm   | , trace  |   |   |  | <u> </u>  |   | 10   |   |
|            |                          | sand-sized quartz, dry, 10Y 5/1 gr   | reenish  | 100   | 12  |  |   | SPT Sample  | er 12  |   |
| 18 0       |                          | gray (CH)  |  |   |   |  | -58.6   | ·   | 14   | 26  |
| 10.0       |                          | SAND, clayey, low plasticity, firm,  | some   |   |   |  | -30.0   |   | 12   |   |
|            |                          | angular to subangular fine-grained sand-sized quartz, drv. 10Y 5/1 qu  | d<br>reenish   | 100   | 13  |  |   | SPT Sample  | er 11  |   |
|            |                          | gray (SC)  |  |   |   |  | 00.4  | G Gamp.   |  | 23  |
|            |                          |  |  |   |   |  | -60.1   |   |  |   |
|            |                          |  |  | 100   | 14  |  |   | SPT Sample  |  |   |
| 04.0       |                          |  |  |   | ' '   |  | 04.0  | or r campi  |  | 37  |
| 21.0       | (/////                   |  |  |   |   |  |   | (0.01)  |  |   |
|            |                          | these original files.  2. Soils are field visually classifie accordance with the Unified Soils Classification System.  3. Set 54.5 ft. of 4" flush joint stered. Water depth recorded at start operations and referenced to the at the Mayport Bar Pilots Dock.  5. Water depth of -42.0 ft. record AM on 8/25/09. Tide gage reading mllw  6. Additional lab test results were February 2011  7. Laboratory Testing Results  SAMPLE SAMPLE LABOR ID DEPTH CLASSIID DEPTH CLASSIID SEPTH CLASSIID SEPTH | el casing of drilling tidal station ed at 08:33 g of +1.4 ft. e added  RATORY FICATION   |   |   |  |   |   |  |   |
| N 16       | COORDI<br>6,172<br>DEPTH | COORDINATES  | CLAY, fat, medium plasticity, firm angular to subangular fine-grainer sand-sized quartz, dry, 10Y 5/1 gray (CH)  SAND, clayey, low plasticity, firm, angular to subangular fine-grainer sand-sized quartz, dry, 10Y 5/1 gray (SC)  NOTES:  1. USACE Jacksonville is the cust these original files.  2. Soils are field visually classific accordance with the Unified Soils Classification System.  3. Set 54.5 ft. of 4" flush joint stered to the at the Mayport Bar Pilots Dock.  5. Water depth recorded at start operations and referenced to the at the Mayport Bar Pilots Dock.  5. Water depth of -42.0 ft. record AM on 8/25/09. Tide gage reading mllw  6. Additional lab test results were February 2011  7. Laboratory Testing Results  SAMPLE SAMPLE LABOR ID DEPTH CLASSIID DEPTH CLA | CLASSIFICATION OF MATERIALS  CLAY, fat, medium plasticity, firm, trace angular to subangular fine-grained sand-sized quartz, dry, 10Y 5/1 greenish gray (CH)  SAND, clayey, low plasticity, firm, some angular to subangular fine-grained sand-sized quartz, dry, 10Y 5/1 greenish gray (SC)  NOTES:  1. USACE Jacksonville is the custodian for these original files.  2. Soils are field visually classified in accordance with the Unified Soils Classification System.  3. Set 54.5 ft. of 4" flush joint steel casing 4. Water depth recorded at start of drilling operations and referenced to the tidal station at the Mayport Bar Pilots Dock.  5. Water depth of -42.0 ft. recorded at 08:33 AM on 8/25/09. Tide gage reading of +1.4 ft. mllw  6. Additional lab test results were added February 2011  7. Laboratory Testing Results  SAMPLE SAMPLE LABORATORY ID DEPTH CLASSIFICATION  2 1.5/3.0 SP* 5 6.0/7.5 SP-SM* 7 9.0/10.5 SP-SM* *Lab visual classification based on gradation | CLASSIFICATION OF MATERIALS    CLASSIFICATION OF MATERIALS   REC. | CLASSIFICATION OF MATERIALS   CLASSIFICATION OF MATERIALS   REC.   CLASSIFICATION OF MATERIALS   CLASSIFICATION OF MATERIALS   REC.   CLASSIFICATION OF MATER | CLASSIFICATION OF MATERIALS   Rec.   Sec.   CLAY, fat, medium plasticity, firm, trace angular to subangular fine-grained sand-sized quartz, dry, 10Y 5/1 greenish gray (CH)   SAND, clayey, low plasticity, firm, some angular to subangular fine-grained sand-sized quartz, dry, 10Y 5/1 greenish gray (CH)   SAND, clayey, low plasticity, firm, some angular to subangular fine-grained sand-sized quartz, dry, 10Y 5/1 greenish gray (SC)   SAND, clayey, low plasticity, firm, some angular to subangular fine-grained sand-sized quartz, dry, 10Y 5/1 greenish gray (SC)   NOTES:  1. USACE Jacksonville is the custodian for these original files.  2. Soils are field visually classified in accordance with the Unified Soils Classification System.  3. Set 54.5 ft. of 4" flush joint steel casing  4. Water depth recorded at start of drilling operations and referenced to the tidal station at the Mayport Bar Pilots Dock.  5. Water depth of -42.0 ft. recorded at 08:33 AM on 8/25/09. Tide gage reading of +1.4 ft. millw  6. Additional lab test results were added February 2011  7. Laboratory Testing Results  SAMPLE SAMPLE LABORATORY ID DEPTH CLASSIFICATION  2 1.5/3.0 SP* 5 6.0/7.5 SP-SM* 7 9.0/10.5 SP-SM* 1-Lab visual classification based on gradation | CLASSIFICATION OF MATERIALS   REC.   Section   CLAY, fat, medium plasticity, firm, trace angular to subangular fine-grained sand-sized quantz, dry, 10Y 5/1 greenish gray (SC)   13   -68.4   SPT Sampler   49   50/0. |

| DRI  | LLING               | LOG     | DIVISION   | INST   |         | 0.000           |                    |  | SHEET 1           | 123     |
|------|---------------------|---------|--|--|---------|-----------------|--------------------|--|-------------------|---------|
| PRO. |                     | _00     | South Atlantic   | 1500   |         | ville D         |                    |  | OF 2 SH           | EETS    |
|      | acksonville         | U-A     | CDD  | 1500   |         | 200             | E OF BIT See       | Remarks  | VERTICAL          |         |
| 1000 | 27127777            |         | R CHANNEL  | 10.  |         |                 | ne, FLE (U.S. Ft.) | A CONTRACTOR OF THE PROPERTY O | 2000              |         |
|      | ING DESIGN          |         | NO POSITION OF ACCOUNT   | 11. 1  |         |                 | RER'S DESIGNATION  | NAD83  | MLLW<br>UTO HAMME |         |
|      | B-JHPM09            |         | X = 518,015 Y = 2,200,448  | 3.07   |         |                 | 0-50 Truckrig      |  | ANUAL HAN         |         |
| DRIL | LING AGEN           | ICY     | CONTRACTOR FILE NO.  | 42 1   | OTAL    | SAMP            |                    | ISTURBED UN  | DISTURBED         | (UD)    |
|      | hallenge E          |         | ering & Testing, Inc. 2009D08  | 12.  | UIAL    | SAME            | LES                |  | 0                 |         |
|      | arvin Stric         | 200     |  | 13. 1  | OTAL    | NUMB            | SER CORE BOXES     | 2  |                   |         |
|      | CTION OF            |         | DEG. FROM BEARING  | 14. E  | LEVA    | TION G          | ROUND WATER        | TIDAL  |                   |         |
| ×    | VERTICAL<br>NCLINED |         | DEG. FROM BEARING  | 15. 1  | ATE     | BORING          | G                  | 08-28-09   | 08-29-0           |         |
| THIC | KNESS OF            | OVERB   | URDEN N/A  | 16. 1  | LEVA    | TION T          | OP OF BORING       | -49.4 Ft.  |                   |         |
| DEPT | TH DRILLED          | INTO F  | ROCK N/A   |  | 1247.53 | 1400 5 5        | VERY FOR BORING    | 93 %   |                   |         |
| TOTA | AL DEPTH C          | DE BORI | ING 13.5 Ft.   | 18. SIGNATURE AND TITLE OF INSPECTOR  V. J. Thompson I I I, Civil Engineer |         |                 |                    |  |                   |         |
| 1    |                     |         | 10.011.  | 4  | _       | _               | npson III, Civil E | ingineer   | -                 |         |
| EV.  | DEPTH               | LEGEND  | CLASSIFICATION OF MATERIALS  | RÉ   | BOX OR  | ROD<br>OR<br>UD |                    | REMARKS  | BLOWS/<br>0.5 FT. | N-VALUE |
| 9.4  | 0.0                 |         |  |  |         |                 | -49.4              |  |                   |         |
| 9.6  | 0.2                 | 1111    | SHELL, mostly angular to subangular shell up to 1-1/2", wet, 10Y 3/1 very dark greenist    | - /  |         |                 |                    |  | 14                |         |
|      |                     | 11111   | gray   | / 93   | 1       |                 |                    | SPT Sampler  | 23                |         |
| 1    |                     | HHI     | SAND, silty, mostly angular to subangular  |  |         |                 | -50.8              |  | 50/0.4            | 73+     |
|      |                     | 11111   | fine to medium-grained sand-sized quartz,<br>little silt, wet, 10Y 3/1 very dark greenish  | 40   |         | # 1             |                    | Advanced Boring  | 44                |         |
| 1    | <u> </u>            | HiHih   | gray (SM)  | 10   | 10      |                 | -51.5              | SPT Sampler  | 41<br>\50/0.1'    |         |
|      |                     |         | At Él50.9 Ft., few subrounded limestone up to 1" At El51.4 Ft., 10Y 4/1 dark greenish gray |  | 2       |                 | -52.4              | Advanced Boring  | (30/0.1)          |         |
|      |                     |         | At El52.9 Ft., few angular to subangular   | 10   | 0 3     |                 | -53.3              | SPT Sampler  | 11<br>50/0.4'     |         |
|      | 7                   | 1111    | shell up to 3/4", 5Y 5/2 olive gray  |  |         |                 | -53.9              | Advanced Boring  | 7 5 7             |         |
|      | -                   | 1111    |  |  |         |                 | 00.0               |  | 18                |         |
| 1    | _                   | HH      |  | 87   | 4       |                 |                    | SPT Sampler  | 25                |         |
|      |                     |         |  | 0.   | 1       |                 | 9.4                | Or i Gampier   |                   | 44      |
| 5.4  | 6.0                 |         | CLAY, lean, low plasticity, firm, dry,   | - 26-  | +       | 4               | -55.4              |  | 19                |         |
|      |                     |         | 10Y 6/1 greenish gray (CL)   | 110  |         |                 |                    |  | 18                |         |
|      |                     |         |  | 93   | 5       |                 |                    | SPT Sampler  | 26                | 44      |
|      | -                   |         |  |  | C T     |                 | -56.9              |  | 18                | 10000   |
|      |                     |         |  |  |         | -50             |                    |  | 8                 |         |
|      | -                   |         | At El57.4 Ft., medium plasticity, firm   | 87   | 6       | 8               |                    | SPT Sampler  | 8                 | 200     |
| 1    |                     |         |  |  |         |                 | 50.4               |  | 10                | 18      |
|      | 3                   |         |  | 0  | *       | d I             | -58.4              |  | 167               |         |
|      |                     |         |  | 155  |         |                 |                    | ODT C  | 9                 |         |
|      |                     |         |  | 10   | 0 7     |                 |                    | SPT Sampler  | 12                | 23      |
| 1    |                     | 1//     |  | 4  |         |                 | -59.9              |  | 11                | 120     |
| 1    |                     |         | At El59.9 Ft., medium plasticity, firm, few angular to subangular fine-grained             |  |         |                 |                    |  | 6                 |         |
| ŀ    | -                   | 1//     | sand-sized quartz  | 10   | 0 8     |                 |                    | SPT Sampler  | 8                 | 4.2     |
| 1    |                     |         |  |  |         |                 | -61.4              |  | 10                | 18      |
| ł    | 7                   | ///     |  |  | 1       |                 | -01.4              |  | 6                 |         |
|      | -                   |         |  | 0-   |         |                 |                    | CDT Complete   | -                 |         |
|      |                     |         |  | 87   | 9       |                 | E.                 | SPT Sampler  | - 8               | 16      |
| 2.9  | 13.5                | 1//     |  | - 20   | -       |                 | -62.9              |  | 8                 | 100     |
|      | ·                   |         | NOTES:  1. USACE Jacksonville is the custodian for   |  |         |                 |                    | /30" drop used wit<br>(1-3/8" I.D. x 2" O.   |                   |         |
|      |                     |         | these original files.  |  |         |                 |                    |  |                   |         |

| DRILLING LO         | G (Cont. Sheet)  | INSTALLA<br>Jackso   |       | Distr            | ict             |              | SHEET 2 OF 2 S    |         |
|---------------------|--|--|-------|------------------|-----------------|--------------|-------------------|---------|
| ROJECT              |  | COORDINA   |       |                  |                 | M HORIZONTAL | VERTICAL          |         |
| Jacksonville Harbor | GRR  | State F  |       |                  |                 |              | MLLW              |         |
| OCATION COORDINATE  | ES   | ELEVATIO   | N ТОР | OF B             | ORING           |              |                   |         |
|                     | 2,200,448  | -49.4 F  | t.    |                  |                 |              |                   |         |
| ELEV. DEPTH         | CLASSIFICATION OF MATERIA  | ALS  | REC.  | BOX OR<br>SAMPLE | RQD<br>OR<br>UD | REMAR        | BLOWS/<br>0.5 FT. | N-VALUE |
|                     | 2. Soils are field visually classified accordance with the Unified Soils Classification System.  3. Set 60.5 ft. of 4" flush joint steel 4. Water depth recorded at start of operations and referenced to the ticat the Mayport Bar Pilots Dock.  5. Water depth of -53.3 ft. recorded PM on 8/28/09. Tide gage reading of mllw  6. Additional lab test results were a February 2011  7. Laboratory Testing Results  SAMPLE SAMPLE LABORA ID DEPTH CLASSIFI  2 1.5/3.0 SM  *Lab visual classification based on curve. No Atterberg limits. | casing dilling dal station d at 13:35 of +3.9 ft. added ATORY CATION |       |                  |                 |              |                   | N       |

| DRI         | LLING               | 100     | DIVISION   | INS  | TAL     | LATIC            | NC              |                           | SHEET 1           | 7.7.5   |
|-------------|---------------------|---------|--|------|---------|------------------|-----------------|---------------------------|-------------------|---------|
| PRO         |                     | _00     | South Atlantic   | _    | -       |                  | ille Di         | 73071                     | OF 2 SH           | EETS    |
|             | JECT<br>acksonville | Lled    | or CPP   | 1500 |         | 1000             | 100             | SYSTEM/DATUM HORIZONTAL   | VERTICAL          |         |
| 100         | 212000              | 10120   | or GRR<br>R CHANNEL  | 10.  |         |                  |                 | e, FLE (U.S. Ft.) NAD83   | MLLW              | -       |
|             | ING DESIG           |         | The second secon | 11.  |         |                  |                 |                           | UTO HAMME         | R       |
|             | B-JHPM0             |         | X = 518,631 Y = 2,202,355  |      |         |                  |                 |                           | MANUAL HAM        |         |
|             | LING AGEN           |         | ering & Testing, Inc. 2009D08  | 12.  | то      | TAL              | SAMPL           | ES DISTURBED U            | NDISTURBED        | (UD)    |
| NAM         | E OF DRILL          | ER      | and a country was  | 13.  | то      | TAL              | NUMB            | ER CORE BOXES 1           |                   |         |
|             | CTION OF            |         | G DEG. FROM BEARING  | 14.  | EL      | EVAT             | ION G           | ROUND WATER TIDAL         |                   |         |
| $\boxtimes$ | VERTICAL            | DUKIN   | G DEG. FROM BEARING VERTICAL   | 15.  | DA      | TE B             | ORING           | STARTED 08-28-09          | 02-28-0           | -       |
| THIC        | KNESS OF            | OVER    | BURDEN N/A   | 16.  | EL      | EVAT             | ION T           | OP OF BORING -45.9 Ft.    |                   |         |
| DEP         | TH DRILLE           | INTO    | ROCK N/A   | 17.  |         | 25.75            | 30.50           | /ERY FOR BORING 94 %      |                   |         |
| TOT         | AL DEPTH            | OF BOE  | ting 16.5 Ft.  | 18.  | -       |                  |                 | ND TITLE OF INSPECTOR     |                   |         |
|             |                     |         | 10010  | 4    |         | _                | _               | npson III, Civil Engineer | ~                 | ш       |
| LEV.        | DEPTH               | LEGEND  | CLASSIFICATION OF MATERIALS  | F    | ÆC.     | BOX OR<br>SAMPLE | RQD<br>OR<br>UD | REMARKS                   | BLOWS/<br>0.5 FT. | N-VALUE |
| 15.9        | 0.0                 |         |  |      |         |                  |                 | -45.9                     |                   |         |
| 16.2        | 0.3                 | 0 00 0  | SHELL, mostly angular to subangular shell up to 1", few angular to subangular fine to  | 1    |         |                  |                 |                           | 5                 | 1       |
|             | 3                   | 11+1+1  | medium-grained sand-sized quartz, wet,   |      | 80      | 1                |                 | SPT Sampler               | 3                 | 45      |
|             | -                   | 1111    | \5Y 4/2 olive gray SAND, silty, mostly angular to subangular   | _/   | r,      | 1                |                 | -47.4                     | 10                | 13      |
|             | 3                   | 11-11-  | fine to medium-grained sand-sized quartz,  | -    |         |                  | 1               | 747.4                     | 9                 |         |
|             | 2                   | 1111    | little silt, trace angular to subangular shell u<br>to 1/4", wet, 10Y 6/1 greenish gray (SM)   |      | 100     | 2                |                 | SPT Sampler               | 9                 |         |
| -           | 701                 | H       | At El47.9 Ft., discontinue shell   |      | 100     | 2                |                 | SF1 Sampler               | -                 | 22      |
| 8.9         | 3.0                 | ijij    | SAND, poorly-graded, mostly angular to   |      |         |                  |                 | -48.9                     | 13                |         |
|             |                     | 1.1     | subangular fine to medium-grained  |      |         | ы                |                 |                           | 4                 |         |
|             |                     |         | sand-sized quartz, wet, 10Y 6/1 greenish gray (SP)   | ,    | 100     | 3                |                 | SPT Sampler               | 15                | 34      |
|             |                     |         | gray (GF)  | 0    |         |                  | 11/4            | -50.4                     | 19                | ٠.      |
| 14          | 2                   | <b></b> |  |      |         |                  |                 |                           | 8                 |         |
|             | -                   |         |  |      | 87      | 4                |                 | SPT Sampler               | 11                |         |
|             |                     |         |  |      |         | ľ                |                 | -51.9                     | 10                | 21      |
|             |                     |         |  | -    |         |                  | 1               | -01.9                     | 48                |         |
|             |                     |         |  |      | 87      | 5                | 44              | SPT Sampler               | 15                |         |
|             | 9.                  |         |  |      | 0,      | 0                |                 |                           | 10                | 25      |
|             | 03.0                |         |  | -    |         | -                | 1               | -53.4                     | 400               |         |
| 3.9         | 8.0                 | 1111    | SAND, silty, mostly angular to subangular  |      | 95      | 6                |                 | SPT Sampler               | 31                |         |
|             | 2                   | THH     | fine-grained sand-sized quartz, little silt,   | 0    |         | -                |                 | -54.4                     | 50/0.4'           |         |
|             | _                   | 1       | moist, moderate cementation,<br>5GY 6/1 greenish gray (SM)   |      |         |                  |                 | -54.9 Advanced Boring     |                   |         |
|             | -                   | TH:     |  |      | Sec. 20 | .07              |                 |                           | 11                |         |
| - 6         | _                   | 1111    | At El55.4 Ft., dry   | 3    | 100     | 7                |                 | SPT Sampler               | 22                | 72+     |
|             |                     | 11-11   |  |      |         |                  |                 | -56.3                     | 50/0.4'           | 7.5     |
| - 3         |                     | 1111    |  | 1    | -7      |                  | }               | -56.4 Advanced Boring     | 15                |         |
|             | -                   | 1111    |  |      | 87      | 8                |                 | SPT Sampler               | 26                |         |
| 7.9         | 12.0                | 111     |  |      | Terror  |                  |                 | The many said             | 23                | 49      |
| 9.19        | 12.0                |         | SILT, inorganic-L, nonplastic, hard, trace   |      |         |                  | 1               | -57.9                     | 12                |         |
|             | -                   |         | subrounded to rounded phosphate up to 1/8", dry, 5GY 6/1 greenish gray (ML)  |      | 100     | 9                |                 | CDT Complet               | -                 |         |
|             | -                   |         | ine, dry, but on greenish gray (ML)  |      | 100     | 9                |                 | SPT Sampler               | 19                | 39      |
|             |                     |         |  |      |         | _                |                 | -59.4                     | 20                | 2.5     |
|             |                     |         |  |      |         |                  |                 |                           | 6                 |         |
|             |                     |         |  |      | 100     | 10               |                 | SPT Sampler               | 10                | 21      |
| - 4         | 2                   | ШШ      | At El60.4 Ft., low plasticity, hard, few   |      |         |                  |                 | -60.9                     | 11                | 21      |

| DRI      | LLING            | LO     | G (Cont. Sheet)  | INSTALLA Jackso           |      |                  |                 | <u> </u>                 | ation CD-3111 IV                            |                | SHE        | ET 2<br>2 SH      | EETS    |
|----------|------------------|--------|--|---------------------------|------|------------------|-----------------|--------------------------|---|----------------|------------|-------------------|---------|
| PROJEC   |                  |        | <u> </u>   | COORDINA                  |      |                  |                 | ·UM                      | HORIZONTAL                                  | VE             | RTICAL     |                   | 5       |
|          | -<br>sonville Ha | rbor ( | GRR  | State F                   |      |                  |                 |                          | NAD83                                       | 1              | MLLW       |                   |         |
| LOCATION | ON COORDII       | NATE   | s  | ELEVATIO                  |      |                  |                 |                          |   |                |            |                   |         |
| X = 5    | 18,631           | Y = 2  | ,202,355   | -45.9 F                   | t.   |                  |                 |                          |   |                |            |                   |         |
| ELEV.    | DEPTH            | LEGEND | CLASSIFICATION OF MATERIA  | LS                        | REC. | BOX OR<br>SAMPLE | RQD<br>OR<br>UD |                          | REMARKS                                     |                |            | BLOWS/<br>0.5 FT. | N-VALUE |
|          |                  |        | subrounded to rounded phosphate to 1/8", few clay  | up to                     |      |                  |                 |                          |   |                |            | 10                |         |
| -62.4    | 16.5             |        | At El61.9 Ft., trace angular to sub<br>shell up to 1-1/2"  | angular                   | 100  | 11               |                 | -62.4                    | SPT Sampl                                   | er             | _          | 12<br>16          | 28      |
|          |                  |        | NOTES:  1. USACE Jacksonville is the custo these original files  | odian for -               |      |                  |                 | 140# ham<br>2.0' split s | mer w/30" drop use<br>poon (1-3/8" I.D. x 2 | d wit<br>2" O. | th<br>D.). |                   |         |
|          |                  |        | Soils are field visually classified accordance with the Unified Soils - Classification System  |                           |      |                  |                 |                          |   |                |            |                   |         |
|          |                  |        | <ol> <li>Set 55.5 ft. of 4" flush joint steel</li> <li>Water depth recorded at start of operations and referenced to the tid at the Mayport Bar Pilots Dock.</li> </ol>  | drilling                  |      |                  |                 |                          |   |                |            |                   |         |
|          |                  |        | 5. Water depth of -47.7 ft. recorded AM on 8/28/09. Tide gage reading of mllw  5. Water depth of -47.7 ft. recorded to the same state of | d at 10:55<br>of +1.8 ft. |      |                  |                 |                          |   |                |            |                   |         |
|          |                  |        | Additional lab test results were a     February 2011 -   | idded -                   |      |                  |                 |                          |   |                |            |                   |         |
|          |                  |        | 7. Laboratory Testing Results  |                           |      |                  |                 |                          |   |                |            |                   | ŀ       |
|          |                  |        | SAMPLE SAMPLE LABORA<br>ID DEPTH CLASSIFION  |                           |      |                  |                 |                          |   |                |            |                   |         |
|          |                  |        | 2 1.5/3.0 SM<br>4 4.5/6.0 SM   |                           |      |                  |                 |                          |   |                |            |                   |         |
|          |                  |        | *Lab visual classification based on ocurve. No Atterberg limits.   | gradation                 |      |                  |                 |                          |   |                |            |                   |         |
|          |                  |        |  |                           |      |                  |                 |                          |   |                |            |                   |         |
|          |                  |        |  |                           |      |                  |                 |                          |   |                |            |                   |         |
|          |                  |        |  |                           |      |                  |                 |                          |   |                |            |                   |         |
|          |                  |        |  |                           |      |                  |                 |                          |   |                |            |                   |         |
|          |                  |        |  |                           |      |                  |                 |                          |   |                |            |                   |         |
|          |                  |        |  |                           |      |                  |                 |                          |   |                |            |                   |         |
|          |                  |        |  |                           |      |                  |                 |                          |   |                |            |                   |         |
|          |                  |        |  |                           |      |                  |                 |                          |   |                |            |                   |         |

| DDII          | LLING               | LOG      | DIVISION  | INSTAL        |                  |                 |                             | SHEET 1           | 7.7     |
|---------------|---------------------|----------|---|---------------|------------------|-----------------|-----------------------------|-------------------|---------|
| PRO           |                     | -00      | South Atlantic  |               | _                | ville Di        |                             | OF 2 SH           | EETS    |
|               | IECT<br>acksonville | · U      | CDB   | 1500          | 1                |                 | SYSTEM/DATUM HORIZONTAL     | VERTICAL          |         |
| 0.50          |                     |          | R CHANNEL   | 11 TO 11 TO 1 |                  |                 | e, FLE (U.S. Ft.) NAD83     | MLLW              |         |
|               | NG DESIG            |          | LOCATION COORDINATES  |               |                  |                 |                             | AUTO HAMME        | R       |
|               | B-JHPMO             |          | X = 519,910 Y = 2,203,897   |               | Died             | Irich D         |                             | MANUAL HAN        | 1000    |
| C             |                     | ngineer  | ring & Testing, Inc. 2009D08  | 12. TO        | TAL              | SAMPL           | ES DISTURBED U              | O 0               | (UD)    |
|               | E OF DRILL          |          |   | 13. TO        | TAL              | NUMB            | ER CORE BOXES 1             |                   |         |
|               | arvin Stric         |          | DEG. FROM BEARING<br>VERTICAL   | 14. EL        | EVAT             | ION G           | ROUND WATER TIDAL           |                   |         |
| $\boxtimes$ v | ERTICAL<br>NCLINED  |          | VERTICAL  | 15. DA        | TE B             | ORING           | STARTED<br>08-28-09         | 08-28-0           |         |
| THIC          | KNESS OF            | OVERBU   | JRDEN N/A   | 16. EL        | EVAT             | ION T           | OP OF BORING -46.3 Ft.      |                   |         |
| DEPT          | H DRILLE            | INTO R   | OCK N/A   | 1,5000        | 45.75            | 190 5 50        | /ERY FOR BORING 75 %        |                   |         |
| TOTA          | L DEPTH             | OF BORIN | NG 15.0 Ft.   | 18. SI        |                  |                 | npson III, Civil Engineer   |                   |         |
|               |                     | ٥        |   | 4             | _                | _               | npsort it i, Civil Engineer | 76.               | m       |
| LEV.          | DEPTH               | LEGEND   | CLASSIFICATION OF MATERIALS   | RÉC.          | BOX OR<br>SAMPLE | ROD<br>OR<br>UD | REMARKS                     | BLOWS/<br>0.5 FT. | N-VALUE |
| 6.3           | 0.0                 |          |   |               |                  |                 | -46.3                       |                   |         |
|               |                     |          | SAND, poorly-graded, mostly angular to<br>subangular fine to medium-grained             |               |                  |                 |                             | 6                 |         |
| 1             |                     |          | sand-sized quartz, some angular to  | 67            | 1                | ш               | SPT Sampler                 | 7                 | 40      |
| -             |                     |          | subangular shell up to 1-1/2", wet,<br>5Y 5/2 olive gray (SP)                           |               | Ш                | ш               | -47.8                       | 5                 | 12      |
|               |                     |          | 3.7 (2.7)   | 7             |                  | 1 1             |                             | 4                 |         |
|               |                     |          |   | 67            | 2                |                 | SPT Sampler                 | 4                 |         |
|               |                     | ::::     |   |               |                  | Ш               | -49.3                       | 4                 | 8       |
|               | -                   |          |   | 0             |                  | 1               | -49.3                       | 6                 |         |
|               |                     |          |   | 47            | 3                | ш               | SPT Sampler                 | 6                 |         |
|               |                     |          |   | 14.0          | Ü                |                 | The section flats           | - 6               | 12      |
| 8.0           | 4.5                 |          | SAND, poorly-graded with silt, mostly   | -             | -                | 1               | -50.8                       | 5                 |         |
| -             | -                   | . 111    | angular to subangular fine to medium-grained sand-sized quartz, some                    | 73            | 4                |                 | CDT Complex                 | 6                 |         |
|               |                     | 9 1      | angular to subangular shell up to 3/4", few   | 13            | 4                | Ш               | SPT Sampler                 |                   | 11      |
| F             | _                   |          | silt, wet, 5Y 5/2 olive gray (SP-SM)  | -             |                  | 1               | -52.3                       | 5                 |         |
| -             |                     | :411     |   |               | _                |                 |                             | 2                 |         |
| 1             | 5                   | -:       |   | 73            | 5                | ш               | SPT Sampler                 | 3                 | 8       |
| 3.8           | 7.5                 | ::!!     | SAND, poorly-graded, mostly angular to  |               | -                |                 | -53.8                       | 5                 |         |
|               | -                   |          | subangular medium to coarse-grained   | 100           |                  | Ш               |                             | - 6               |         |
| 1             |                     |          | sand-sized quartz, some angular to<br>subangular shell up to 3/4", moist,               | 100           | 6                | H               | SPT Sampler                 | 7                 | 16      |
|               | _                   |          | 5Y 5/2 olive gray (SP)  |               |                  |                 | -55.3                       | 9                 |         |
|               |                     |          | At El SEO Et manth, and de te automotion  |               |                  |                 |                             | 7                 |         |
| 1             |                     |          | At El55.8 Ft., mostly angular to subangula<br>fine to medium-grained sand-sized quartz, | 87            | 7                |                 | SPT Sampler                 | 7                 | 15      |
|               |                     |          | few angular to subangular shell up to 2",<br>5Y 6/1 gray                                |               |                  |                 | -56.8                       | 8                 |         |
| 1             | i<br>⊒a             |          | o. o. i gray  |               |                  |                 |                             | 5                 |         |
|               |                     | : : :    |   | 67            | 8                |                 | SPT Sampler                 | 6                 | 14      |
|               |                     |          |   |               |                  |                 | -58.3                       | 8                 | 14      |
| 4             |                     |          |   |               |                  |                 |                             | 1                 |         |
|               |                     |          |   | 100           | 9                |                 | SPT Sampler                 | 3                 |         |
|               |                     |          |   |               |                  |                 | -59.8                       | 4                 | 7       |
|               |                     |          | At El59.8 Ft., little angular to subangular   |               |                  |                 | 00.0                        | 2                 |         |
|               | 7                   | :::      | shell up to 2"  | 73            | 10               |                 | SPT Sampler                 | 4                 |         |
|               |                     | 1.       |   | 1             |                  |                 | -61.3                       | 3                 | 7       |

| DRILL   | LING       | LO           | G (Cont. Sheet)   | INSTALLA   |      | Dist   | iot             |   | SHE      |                   |    |
|---------|------------|--------------|---|--|------|--|-----------------|---|----------|-------------------|----|
| ROJECT  |            |              | 1   | Jackso   |      |  |                 | UM HORIZONTAL   | VERTICAL | 2 SHEET           | 15 |
|         | nville Haı | bor          | GRR   | State F  |      |  |                 | I .   | MLLW     |                   |    |
| OCATION |            |              |   | ELEVATIO   |      |  |                 | <del>`</del>  | •        |                   |    |
| X = 519 | 9,910      | <b>/</b> = 2 | ,203,897  | -46.3 F  | t.   |  |                 |   |          |                   |    |
| ELEV. D | DEPTH      | LEGEND       | CLASSIFICATION OF MATERIA   | LS   | REC. | BOX OR<br>SAMPLE   | RQD<br>OR<br>UD | REMAR   | KS       | BLOWS/<br>0.5 FT. |    |
|         |            |              | NOTES:  1. USACE Jacksonville is the custof these original files.  2. Soils are field visually classified accordance with the Unified Soils Classification System.  3. Set 55.5 ft. of 4" flush joint steel  4. Water depth recorded at start of operations and referenced to the tid at the Mayport Bar Pilots Dock.  5. Water depth of -47.8 ft. recorded AM on 8/28/09. Tide gage reading of milw  6. Additional lab test results were at February 2011  7. Laboratory Testing Results  SAMPLE SAMPLE LABORA ID DEPTH CLASSIFICATION SP 4 4.5/6.0 SP  *Lab visual classification based on grouve. No Atterberg limits. | casing drilling al station d at 08:20 of +1.5 ft. ddded ATORY CATION * - * - |      | ON THE PROPERTY OF THE PROPERT |                 | 140# hammer w/30" drop to 2.0' split spoon (1-3/8" I.D. | sed with |                   |    |

| DDI  | LLING               | LOG     | DIVISION   | INSTA                                    | LLATI            | ON              |  | SHEET 1           | 7.1     |
|------|---------------------|---------|--|--|------------------|-----------------|--|-------------------|---------|
| PRO. |                     | _06     | South Atlantic   |  |                  | ville D         |  | OF 2 SH           | EETS    |
|      |                     |         | 000  | 100                                      |                  | 200             | See Remarks SYSTEM/DATUM HORIZONTAL  | VERTICAL          |         |
| -    | acksonville         |         | R CHANNEL  | 10. 0                                    |                  | 1000            | ne, FLE (U.S. Ft.) NAD83   | MLLW              |         |
|      | ING DESIG           |         | THE PART OF PARTY AND ADDRESS OF THE PARTY AND | 11. M                                    |                  |                 | RER'S DESIGNATION OF DRILL   |                   | R       |
|      | B-JHPM0             |         | X = 520,152 Y = 2,205,593  |  | Diec             | Irich D         | 0-50 Truckrig  |                   |         |
| C    |                     | Engine  | contractor file no. ering & Testing, Inc. 2009D08  | 12. T                                    | OTAL             | SAMPI           | LES DISTURBED  | UNDISTURBED<br>0  | (UD)    |
|      | E OF DRILL          |         |  | 13. T                                    | OTAL             | NUMB            | ER CORE BOXES 2  |                   |         |
|      | CTION OF            |         | DEG. FROM BEARING  | 14. E                                    | LEVAT            | TION G          | ROUND WATER TIDAL  |                   |         |
|      | VERTICAL<br>NCLINED |         | VERTICAL   | 15. D                                    | ATE B            | ORING           | STARTED 08-27-09   | 08-27-0           |         |
| THIC | KNESS OF            | OVERE   | BURDEN N/A   | 16. E                                    | LEVAT            | TION T          | OP OF BORING -45.1 Ft.   |                   | 14      |
| DEP  | TH DRILLE           | OTNI    | ROCK N/A   |  | ALC: N           | 190 5 50        | VERY FOR BORING 71 %   |                   |         |
| тот  | AL DEPTH C          | OF BOR  | ING 16.5 Ft.   | 18. S                                    |                  |                 | AND TITLE OF INSPECTOR   |                   |         |
| 1    |                     | T       |  | 4  | _                | _               | npson III, Civil Engineer  | ~                 | ш       |
| LEV. | DEPTH               | LEGEND  | CLASSIFICATION OF MATERIALS  | RÉC                                      | BOX OR<br>SAMPLE | RQD<br>OR<br>UD | REMARKS  | BLOWS/<br>0.5 FT. | N-VALUE |
| 15.1 | 0.0                 |         | Constitution of the Consti |  |                  |                 | -45.1  |                   |         |
|      |                     |         | SAND, silty, mostly angular to subangular<br>fine-grained sand-sized quartz, some angula   | ar.                                      |                  |                 |  | 10                |         |
|      |                     | 1-1-    | to subangular shell up to 1-1/2", little silt,   | 67                                       | 1                |                 | SPT Sampler  | 10                | 52      |
|      |                     | HIHI    | wet, 5Y 5/2 olive gray (SM)  |  |                  |                 | -46.6  | 12                | 22      |
|      |                     | 1111    |  | 7  |                  |                 | -40.0  | 7                 |         |
|      | 2                   | Hill    |  | 67                                       | 2                |                 | SPT Sampler  | -                 |         |
|      |                     | 11111   | At El47.6 Ft., little angular to subangular  | 0,                                       | -                |                 | 33-2-2-2   | 7                 | 15      |
|      | -                   | 1111    | shell up to 2", 5Y 5/1 gray  | 1  |                  |                 | -48.1  |                   |         |
| - 4  |                     | 1+1+1   |  | 70                                       |                  | 1 1             | 007.0  | 12                |         |
|      | _                   | H       |  | 73                                       | 3                |                 | SPT Sampler  | 7                 | 14      |
|      | -                   | 1+1+    |  | 4  |                  |                 | -49.6  | 7                 |         |
|      | -                   | HIHIL   | At El50.1 Ft., 5Y 5/2 olive gray   | la la la la la la la la la la la la la l | lo.              |                 | Total and the second of the se | 5                 |         |
|      |                     | 11-11-1 | ACE30.11 L., 31 3/2 dive gray  | 73                                       | 4                |                 | SPT Sampler  |                   | 11      |
| 1.1  | 6.0                 | HH      | OUT I  | 746                                      |                  |                 | -51.1  | 7                 | 1000    |
|      |                     | 0 00 0  | SHELL, mostly angular to subangular shell up to 1", few angular to subangular  |  |                  |                 | 10 - 10 -  | 4                 |         |
|      |                     | 0 00 0  | fine-grained sand-sized quartz, wet,<br>5Y 5/2 olive gray  | 60                                       | 5                |                 | SPT Sampler  | 7                 | 17      |
| 2.6  | 7.5                 | 0 00 0  |  |  |                  |                 | -52.6  | 10                | 1.0     |
|      | -                   |         | SAND, poorly-graded, some angular to<br>subangular fine-grained sand-sized quartz,   |  |                  |                 |  | 5                 |         |
|      | _                   |         | few angular to subangular shell up to 3/8",  | 80                                       | 6                |                 | SPT Sampler  | 6                 |         |
|      |                     |         | moist, 5Y 5/1 gray (SP)  |  |                  |                 | -54.1  | 5                 | 11      |
|      |                     |         | At El54.4 Ft., 5Y 4/2 olive gray   |  |                  |                 |  | 4                 |         |
|      | -                   |         | The Division of the Onixe gray   | 60                                       | 7                |                 | SPT Sampler  | 4                 | 715     |
| 55.6 | 10.5                | ::::    |  |  |                  |                 | -55.6  | 6                 | 10      |
| 0.0  | 10.0                | ככככ    | SHELL, mostly angular to subangular shell  |  |                  | 1               |  | 5                 |         |
|      | -                   | 0 00 0  | up to 3/8", few angular to subangular fine-grained sand-sized quartz, moist,   | 67                                       | 8                |                 | SPT Sampler  | -                 |         |
|      |                     | 0 00 0  | 5Y 5/2 olive gray  | 0,                                       |                  |                 | The report of  | 6                 | 11      |
|      | 3                   | 0 00 0  | At El57.1 Ft., some angular to subangular  | -  | H                |                 | -57.1  | 4                 |         |
|      |                     | 0 00 0  | fine-grained sand-sized quartz   | 100                                      | 0                |                 | ODT O  | _                 |         |
|      | -                   | 0 00 0  |  | 53                                       | 9                |                 | SPT Sampler  |                   | 10      |
|      |                     | 0 00 0  |  | 0  |                  | 2               | -58.6  | 6                 | 100     |
|      |                     | 0 00 0  | At El59.1 Ft., mostly angular to subangula   |  |                  |                 |  | _ 4               |         |
|      |                     | 0 00 0  | shell up to 2", little angular to subangular   | 87                                       | 10               |                 | SPT Sampler  | -                 | 12      |
| - 19 | -                   | 0 00 0  | fine-grained sand-sized quartz   | 11/2                                     |                  |                 | -60.1  | 7                 |         |

| DR     | ILLING      | LO               | G (Cont. Sheet)                 | INSTALLA<br>Jackso  |        | Distr            | rict            | <u> </u>   | SHEET 2<br>OF 2 S      |               |              |
|--------|-------------|------------------|---------------------------------|---|--------|------------------|-----------------|--|------------------------|---------------|--------------|
| PROJEC | т           |                  |                                 | COORDINA  |        |                  |                 | UM HORIZONTAL  | VERTICAL               |               |              |
| Jack   | sonville Ha | arbor (          | GRR                             | State F   | Plane, | FLE              | (U.S            | . Ft.) NAD83   | MLLW                   |               |              |
| LOCATI | ON COORDI   | NATE             | s                               | ELEVATIO  | N TOP  | OF E             | BORIN           | G  |                        |               |              |
| X = !  | 520,152     | Y = 2            | ,205,593                        | -45.1 F   | t.     |                  |                 |  |                        |               |              |
| ELEV.  | DEPTH       | LEGEND           | CLASSIFICATION OF MATER         | RIALS   | REC.   | BOX OR<br>SAMPLE | RQD<br>OR<br>UD | REMARK   | s<br>BLOWS/<br>0.5 FT. | N-VALUE       | 4.5          |
|        |             | ) )) )<br>) )) ) |                                 |   | 00     | 44               |                 | ODT 0  | 11                     | <b>-</b>    - | 15<br>-<br>- |
| -61.1  | 16.0        | 0 00 0           | SAND poorly-graded with silt mo | nstly   | 93     | 11               |                 | SPT Sam  |                        | 56            | -            |
| -61.6  | 16.5        |                  | ID DEPTH CLASSI                 | d y 5/2 olive / stodian for ed in ele casing of drilling tidal station ded at 12:45 g of +3.8 ft. e added |        |                  |                 | -61.6  140# hammer w/30" drop us 2.0' split spoon (1-3/8" I.D. x | ded with 2" O.D.).     |               |              |

| DRI    | LLING                           | LOG      | DIVISION   |            |      | LATIC            |                 |                            | SHEET 1           | 100     |
|--------|---------------------------------|----------|--|------------|------|------------------|-----------------|----------------------------|-------------------|---------|
| . PRO. | 30.00                           | -00      | South Atlantic   |            |      |                  | ille Di         |                            | OF 2 SH           | EETS    |
|        | 100                             | o Llock  | CDD  | 1532       |      | 100              |                 | SYSTEM/DATUM HORIZONTAL    | VERTICAL          |         |
| 1000   | acksonville                     |          | R CHANNEL  | 10.        | -00  | 23,000           | and the         | ne, FLE (U.S. Ft.) NAD83   | MLLW              |         |
|        | ING DESIG                       |          | NO. C. S. M. P. P. M. SANT   | 11.        |      |                  |                 | RER'S DESIGNATION OF DRILL |                   | FR      |
| С      | В-ЈНРМО                         | 9-31     | X = 522,200 Y = 2,206,76   | 0. 1. 1577 |      |                  |                 | 0-50 Truckrig              | AGIG III          |         |
|        | LING AGE                        |          | contractor file i  | NO.<br>12. | то   | TAL :            | SAMPL           | LES DISTURBED              | UNDISTURBED       | (UD)    |
|        | E OF DRILL                      |          | aring & resuing, inc. 2003D00  | 13.        | TO   | TAL              | NUMB            | ER CORE BOXES 1            | U                 |         |
| -      | larvin Stric                    |          |  | 14.        | ELI  | EVAT             | ION G           | ROUND WATER TIDAL          |                   |         |
| × V    | CTION OF<br>PERTICAL<br>NCLINED | BORING   | DEG. FROM BEARING VERTICAL   | 1          |      |                  | ORING           | STARTED                    | 08-27-0           |         |
| . THIC | KNESS OF                        | OVERB    | URDEN N/A  | 16.        | ELI  | EVAT             | ION T           | OP OF BORING -46.6 Ft.     |                   |         |
| . DEPT | TH DRILLE                       | D INTO I | ROCK N/A   | 17.        | TO   | TAL              | RECOV           | VERY FOR BORING 79 %       |                   |         |
| TOTA   | AL DEPTH                        | OE BOD   | ING 15.0 Ft.   | 18.        | 1000 |                  | 200             | ND TITLE OF INSPECTOR      |                   |         |
| 1      |                                 | 1 1      | 10.0 1 t.  |            |      |                  |                 | npson III, Civil Engineer  | 7800              | in      |
| ELEV.  | DEPTH                           | LEGEND   | CLASSIFICATION OF MATERIALS  | F          | έc.  | BOX OR<br>SAMPLE | RQD<br>OR<br>UD | REMARKS                    | BLOWS/<br>0.5 FT. | N-VALUE |
| 46.6   | 0.0                             |          |  |            |      |                  |                 | -46.6                      |                   |         |
|        |                                 | -:       | SAND, poorly-graded with silt, mostly<br>angular to subangular fine to   |            |      |                  |                 |                            | 5                 |         |
|        |                                 |          | medium-grained sand-sized quartz, some   |            | 67   | 1                |                 | SPT Sampler                | r 4               | 1.50    |
| 1      | <u> </u>                        |          | angular to subangular shell up to 1", few wet, 5Y 4/1 dark gray (SP-SM)  | silt,      |      |                  | Ш               | -48.1                      | 5                 | 9       |
|        |                                 | 1.11     | wet, 31 4/1 dark gray (3F-3M)  |            |      | -3               | 1               | -40.1                      | 3                 | H       |
| 1      | <del>)</del>                    |          | At El48.6 Ft., some shell up to 2"   |            | 53   | 2                |                 | SPT Sampler                | -                 | 1       |
|        |                                 |          | 0.00 m - 1.00             | 33   | 2                | ш               | or i Samplei               | -                 | 3       |
| - 1    |                                 |          |  | 0          |      |                  | 1               | -49.6                      | 1                 |         |
|        | -                               |          |  |            | 50   |                  |                 | and the second             | 5                 |         |
|        | _                               |          |  |            | 53   | 3                |                 | SPT Sampler                | 1                 | 7       |
| 51.1   | 4.5                             |          |  |            |      |                  |                 | -51.1                      | 3                 |         |
|        | -                               | 0 00 0   | SHELL, mostly angular to subangular shoup to 1", few angular to subangular   | ell        |      |                  | Ш               |                            | 2                 |         |
| H      |                                 | 0 00 0   | fine-grained sand-sized quartz, wet,   |            | 40   | 4                |                 | SPT Sampler                | 2                 | 4       |
| -52.6  | 6.0                             | 0 00 0   | 5Y 4/1 dark gray   |            |      |                  | ш               | -52.6                      | 2                 | 4       |
|        |                                 | 1//      | CLAY, lean, low plasticity, soft, moist, organic odor, 10Y 4/1 dark greenish gray  |            |      |                  | 1 1             |                            | 1                 |         |
|        |                                 |          | (CL)   |            | 100  | 5                |                 | SPT Sampler                | 1                 |         |
|        | -                               |          |  |            |      |                  | Ш               | -54.1                      | 0                 | 1       |
|        |                                 |          |  | -          |      | -                | 1 1             | -04.1                      | 1                 | 1       |
|        |                                 |          |  |            | 80   | 6                | ш               | SPT Sampler                |                   |         |
| - 1    |                                 |          |  |            | 00   | U                | ш               | The state of               | 2                 | 4       |
|        | -                               | 111      |  |            |      | -3               |                 | -55.6                      | - 42              | -       |
|        |                                 | 1//      |  |            |      |                  |                 | 2022 - 10                  | 2                 | -       |
| _      |                                 |          | At El56.6 Ft., little angular to subangula   |            | 100  | 7                |                 | SPT Sampler                | _                 | 4       |
| -57.1  | 10.5                            | 1/4      | shell up to 1"   | al         |      |                  |                 | -57.1                      | 2                 |         |
| ŀ      |                                 |          | CLAY, fat, medium plasticity, firm,<br>discontinue shell, moist, 10Y 4/1 dark  |            |      |                  |                 |                            | 2                 |         |
|        |                                 |          | greenish gray (CH)   |            | 100  | 8                |                 | SPT Sampler                | r 3               | 7       |
| -      |                                 |          | At El57.6 Ft., few wood debris   |            |      |                  |                 | -58.6                      | 4                 |         |
| 4      |                                 |          |  |            |      |                  | 1 1             |                            | 4                 |         |
|        |                                 |          |  |            | 100  | 9                |                 | SPT Sampler                | 3                 |         |
|        | 7                               |          |  |            | 111  | 1                |                 | -60.1                      | 3                 | 6       |
| 1      |                                 |          |  | 4          |      |                  | 1               | -00.1                      | 4                 |         |
|        |                                 |          |  | A.         | 100  | 10               |                 | COT 0                      | 1                 | 1       |
|        |                                 |          |  |            | 100  | 10               |                 | SPT Sampler                | -                 | 11      |
| -61.6  | 15.0                            |          |  |            |      |                  |                 | -61.6                      | 5                 |         |

| DRILLING       | LO     | G (Cont. Sheet)  | Jackso   |       | Dietr            | ict             |   |             | SHEET<br>OF 2     | 2<br>SHEETS |
|----------------|--------|--|--|-------|------------------|-----------------|---|-------------|-------------------|-------------|
| ROJECT         |        | •  | COORDINA   |       |                  |                 | UM HORIZON                                | TAL I       | /ERTICAL          | JEE 13      |
| Jacksonville H | arbor  | GRR  | State F  | lane, | FLE              | (U.S.           | Ft.) NAD8                                 | 3           | MLLW              |             |
| OCATION COORD  | INATE  | s  | ELEVATIO   | N ТОР | OF B             | ORIN            | 3   |             |                   |             |
| X = 522,200    |        | 2,206,760  | -46.6 F  | t.    |                  |                 |   |             |                   |             |
| ELEV. DEPTH    | LEGEND | CLASSIFICATION OF MATERIA  | LS   | ĸĚC.  | BOX OR<br>SAMPLE | RQD<br>OR<br>UD |   | REMARKS     | BLOWS/<br>0.5 FT. | N-VALUE     |
| ELEV. DEPTH    | TEGEN  | NOTES:  1. USACE Jacksonville is the custo these original files.  2. Soils are field visually classified accordance with the Unified Soils Classification System.  3. Set 55.5 ft. of 4" flush joint steel  4. Water depth recorded at start of operations and referenced to the tid at the Mayport Bar Pilots Dock.  5. Water depth of -47.8 ft. recorded AM on 8/27/09. Tide gage reading of milw  6. Laboratory Testing Results  SAMPLE SAMPLE LABORA ID DEPTH CLASSIFIED DEPT | casing drilling lal station d at 09:15 of +1.2 ft. | REC.  | BOX O SAMPL      | ROPE COST       | 140# hammer w/30<br>2.0' split spoon (1-3 | " drop used | with              | N-VALL      |

| DPII | LLING              | LOG   | DIVISION   | INSTA   |                  |                 |  | SHEET 1           | 7.77    |  |  |  |  |
|------|--------------------|---|--|---|------------------|-----------------|--|-------------------|---------|--|--|--|--|
| PRO. |                    | 200   | South Atlantic   | Jacksonville District  OF 2 SHEETS  9. SIZE AND TYPE OF BIT See Remarks               |                  |                 |  |                   |         |  |  |  |  |
|      | acksonville        | . 11  | CDD  | 1335  |                  |                 | SYSTEM/DATUM HORIZONTAL  | VERTICAL          |         |  |  |  |  |
| 1000 |                    |   | R CHANNEL  | 10. 0   |                  |                 | ne, FLE (U.S. Ft.) NAD83   | MLLW              |         |  |  |  |  |
|      | NG DESIG           |   |  | 11. M   |                  |                 | NAME AND ADDRESS OF THE OWNER, WHEN PERSON O | AUTO HAMME        | R       |  |  |  |  |
|      | B-JHPM0            |   | X = 524,075 Y = 2,206,438  | Diedrich D-50 Truckrig MANUAL HAMMER  |                  |                 |  |                   |         |  |  |  |  |
|      | hallenge B         |   | contractor file No.  | DISTURBED UNDISTURBED (UD) 12. TOTAL SAMPLES 12 0                                     |                  |                 |  |                   |         |  |  |  |  |
|      | E OF DRILL         |   | and a second   | 13. T   | OTAL             | NUMB            | ER CORE BOXES 1  | -                 |         |  |  |  |  |
|      | arvin Stric        |   | DEG. FROM BEARING  | 14. ELEVATION GROUND WATER TIDAL  |                  |                 |  |                   |         |  |  |  |  |
| X    | ERTICAL<br>NCLINED | BUKING  | DEG. FROM BEARING<br>VERTICAL  | 15. DATE BORING         STARTED         COMPLETED           08-26-09         08-26-09 |                  |                 |  |                   |         |  |  |  |  |
| THIC | KNESS OF           | OVERB   | URDEN N/A  | 16. E   | LEVA             | TION T          | OP OF BORING -43.5 Ft.   |                   |         |  |  |  |  |
| DEPT | H DRILLE           | O INTO I                                      | ROCK N/A   | 1,9036, 41,03   | ALS TO           | 190 5 50        | VERY FOR BORING 84 %   |                   |         |  |  |  |  |
| TOTA | AL DEPTH           | OF BOR  | NG 18.0 Ft.  | 18. S   |                  |                 | npson III, Civil Engineer  |                   |         |  |  |  |  |
|      |                    | 1 1   |  | -   | _                | _               | inpsoirt it, Civil Engineer  | 7.                | ш       |  |  |  |  |
| LEV. | DEPTH              | LEGEND  | CLASSIFICATION OF MATERIALS  | RÉC   | BOX OR<br>SAMPLE | ROD<br>OR<br>UD | REMARKS  | BLOWS/<br>0.5 FT. | N-VALUE |  |  |  |  |
| 13.5 | 0.0                |   |  |   |                  |                 | -43.5  |                   |         |  |  |  |  |
|      |                    |   | SAND, poorly-graded, mostly angular to<br>subangular fine to medium-grained    |   |                  |                 |  | 4                 |         |  |  |  |  |
|      |                    |   | sand-sized quartz, few angular to subangula                                    | r 67  | 1                | 1 1             | SPT Sampler  | 4                 |         |  |  |  |  |
| -    |                    | shell up to 3/4", wet, 5Y 5/2 olive gray (SP) |  |   | Ш                |                 | -45.0  | 5                 | 9       |  |  |  |  |
|      |                    |   |  | 1   |                  |                 | 1818   | 5                 |         |  |  |  |  |
|      | 7                  |   |  | 67  | 2                |                 | SPT Sampler  | 6                 | 7000    |  |  |  |  |
|      |                    |   |  |   |                  | -46.5           | 7  | 13                |         |  |  |  |  |
|      |                    |   | 3  |   |                  | 1               | 40.0   | 10                |         |  |  |  |  |
| 7.5  | 4.0                |   |  | 80  | 3                |                 | SPT Sampler  | -                 |         |  |  |  |  |
| 7.5  | 4.0                | :111  | SAND, poorly-graded with silt, mostly  |   |                  |                 | Alberta Maria Maria  | 14                | 31      |  |  |  |  |
|      |                    | -:  | angular to subangular medium to<br>coarse-grained sand-sized quartz, few silt, |   | +                |                 | -48.0  | 5                 |         |  |  |  |  |
| ŀ    | -                  |   | discontinue shell, moist, 10Y 3/1 very dark                                    | 87  | 4                |                 | SPT Sampler  |                   |         |  |  |  |  |
|      |                    |   | greenish gray (SP-SM)  | 0,  | 4                | Ш               | 4418   | 12                | 23      |  |  |  |  |
| 1    | _                  |   |  | 9   |                  | 4               | -49.5  | 5                 |         |  |  |  |  |
|      |                    |   |  | 400   | 5                |                 | SPT Sampler  | 100               |         |  |  |  |  |
| -    | -                  | · ;   ;                                       |  | 100   | 5                |                 |  | -                 | 20      |  |  |  |  |
|      |                    |   |  | -   |                  | - 8             | -51.0  | 14                |         |  |  |  |  |
|      |                    |   |  |   |                  |                 | 007.0  | 2                 |         |  |  |  |  |
| 4    |                    |   |  | 67  | 6                | 1 1             | SPT Sampler  | 3-                | 5       |  |  |  |  |
|      | -                  |   |  | ō.  |                  |                 | -52.5  | 2                 |         |  |  |  |  |
|      |                    |   |  | 547   |                  |                 | \$555 M.   | 9                 |         |  |  |  |  |
|      | -                  | :   |  | 80  | 7                |                 | SPT Sampler  | -                 | 29      |  |  |  |  |
|      |                    |   |  | 6,  |                  |                 | -54.0  | 17                |         |  |  |  |  |
|      | _                  |   |  |   |                  |                 | Andrew St.   | 10                |         |  |  |  |  |
|      |                    |   |  | 87  | 8                |                 | SPT Sampler  | 16                | 33      |  |  |  |  |
|      | 3                  |   |  |   |                  |                 | -55.5  | 17                | 50      |  |  |  |  |
| 1    |                    |   |  |   |                  | 1 1             |  | 5                 |         |  |  |  |  |
|      |                    |   |  | 87  | 9                |                 | SPT Sampler  | 10                | 35      |  |  |  |  |
|      | 7                  |   |  |   |                  |                 | -57.0  | 25                | 35      |  |  |  |  |
|      |                    |   |  |   |                  |                 |  | 15                | 1       |  |  |  |  |
|      |                    |   |  | 87  | 10               |                 | SPT Sampler  | 25                | 1       |  |  |  |  |
|      |                    | :-  -   |  |   |                  |                 | -58.5  | 26                | 51      |  |  |  |  |

| DR     | ILLING             | LOC     | 3 (Cont. S   |   | INSTALLA   |   |      |                  |                 |         |         |                                  | SHEET  |                   | ]       |      |
|--------|--------------------|---------|--|---|--|---|------|------------------|-----------------|---------|---------|----------------------------------|--------|-------------------|---------|------|
|        |                    |         | , , , , , , , , , , , ,  |   |  | Jackso  |      |                  |                 |         | !       |                                  | !      | OF 2              | SHEETS  | -    |
| PROJEC | эт<br>csonville Ha | arbor ( | ⊇DD  |   |  | COORDINA<br>State F   |      |                  |                 |         | 1       | ONTAL<br>D83                     | 1      | RTICAL<br>MLLW    |         |      |
|        | ON COORDI          |         |  |   |  | ELEVATIO  |      |                  |                 |         | i INA   | 1000                             | ! !    | VILLVV            |         | 1    |
|        |                    |         | ,206,438   |   |  | -43.5 F   |      | OF B             | OKIN            | G       |         |                                  |        |                   |         |      |
| ELEV.  | DEPTH              | LEGEND  |  | SSIFICATION   | OF MATERIAL  |   | RÉC. | BOX OR<br>SAMPLE | RQD<br>OR<br>UD |         |         | REMARKS                          | 5      | BLOWS/<br>0.5 FT. | N-VALUE | ا    |
|        |                    |         |  |   |  |   | 100  | 11               |                 | -60.0   |         | SPT Samp                         | ler    | 21<br>22          | 43      |      |
| -61.5  | 18.0               |         |  |   |  |   | 100  | 12               |                 | -61.5   |         | SPT Samp                         | ler    | 17<br>21<br>18    | 39      | -    |
|        | 10.0               |         | NOTES:  1. USACE of these original contents are accordance Classification.  3. Set 55.5  4. Water de operations a at the Maypotents.  5. Water de AM on 8/26/mllw.  6. Additional February 20  7. Laborato.  SAMPLE ID.  2 4  *Lab visual of curve. No Among | al files. Ifield visuall with the Un on System. If. of 4" flus epth recorde and reference ort Bar Pilot epth of -46.5/09. Tide gall lab test results all lab test results are Testing For SAMPLE DEPTH 1.5/3.0 4.5/6.0 classification | ly classified in ified Soils  th joint steel of the tidal start of tidal start of the tidal start of the tidal start of the tidal start of ti | casing drilling al station at 11:05 f +3.0 ft. dded TORY CATION |      |                  |                 | 140# ha | ammer w | v/30" drop use<br>(1-3/8" I.D. x | ed wit | th<br>D.).        |         | - 20 |

| DRI    | LLING               | LOG             | DIVISION   | INSTALLATION SHEET 1  Jacksonville District OF 2 SHI                                      |                  |                 |  |                   |         |  |  |  |  |
|--------|---------------------|-----------------|--|---|------------------|-----------------|--|-------------------|---------|--|--|--|--|
| . PRO. |                     | -00             | South Atlantic   |   | _                |                 |  | OF 2 SH           | EETS    |  |  |  |  |
|        |                     | . Uada          | CDB  | 9. SIZE AND TYPE OF BIT See Remarks  10. COORDINATE SYSTEM/DATUM HORIZONTAL VERTICAL      |                  |                 |  |                   |         |  |  |  |  |
| 100    | acksonville         |                 | CHANNEL  | 10. 00  |                  |                 | Control of the second s | 1                 |         |  |  |  |  |
|        | ING DESIG           |                 | LOCATION COORDINATES   | State Plane, FLE (U.S. Ft.) NAD83 MLLW  11. MANUFACTURER'S DESIGNATION OF DRILL AUTO HAMM |                  |                 |  |                   |         |  |  |  |  |
|        | B-JHPM0             |                 | X = 526,130 Y = 2,206,770  | Diedrich D-50 Truckrig  |                  |                 |  |                   |         |  |  |  |  |
|        | LING AGE            |                 | CONTRACTOR FILE NO.  | 12. TOTAL SAMPLES   |                  |                 |  |                   |         |  |  |  |  |
|        | hallenge l          |                 | ring & Testing, Inc. ; 2009D08   | 13. TOTAL NUMBER CORE BOXES 2   |                  |                 |  |                   |         |  |  |  |  |
| -      | larvin Stric        |                 |  | 7   |                  |                 |  |                   |         |  |  |  |  |
| 1      | CTION OF            | BORING          | DEG. FROM BEARING<br>VERTICAL  | 14. EL  | EVAT             | ION G           | ROUND WATER TIDAL  |                   |         |  |  |  |  |
|        | /ERTICAL<br>NCLINED |                 |  | 15. DA  | TE B             | ORING           | STARTED 08-26-09   | 08-26-0           |         |  |  |  |  |
| THIC   | KNESS OF            | OVERBU          | JRDEN N/A  | 16. EL  | EVAT             | ION T           | OP OF BORING -49.2 Ft.   |                   |         |  |  |  |  |
| DEPT   | TH DRILLE           | D INTO R        | ock N/A  | 17. TO  | TAL              | RECOV           | /ERY FOR BORING 92 %   |                   |         |  |  |  |  |
| TOT    | N DEDTH             | OF BODIS        | 12.0 Et  | 18. SIGNATURE AND TITLE OF INSPECTOR  |                  |                 |  |                   |         |  |  |  |  |
| 1017   | AL DEPTH            | 1 1             | NG 12.0 Ft.  | V. J. Thompson III, Civil Engineer  |                  |                 |  |                   |         |  |  |  |  |
| LEV.   | DEPTH               | LEGEND          | CLASSIFICATION OF MATERIALS  | RÉC.  | BOX OR<br>SAMPLE | RQD<br>OR<br>UD | REMARKS  | BLOWS/<br>0.5 FT. | N-VALUE |  |  |  |  |
| 19.2   | 0.0                 |                 | A STATE OF THE STA |   |                  |                 | -49.2  |                   |         |  |  |  |  |
|        |                     | //              | CLAY, fat, medium plasticity, firm, few  |   |                  |                 |  | 1                 |         |  |  |  |  |
|        |                     |                 | angular to subangular shell up to 1/4", trace wood debris, wet, organic odor, 5Y 3/2 dark  | 100   | 1                |                 | SPT Sampler  | 1                 |         |  |  |  |  |
|        | 2                   | olive gray (CH) |  | 1000  |                  |                 | Series of  | 2                 | 3       |  |  |  |  |
|        |                     | 1               | At El50.7 Ft., discontinue shell   | 3   |                  | 1               | -50.7  | 2                 |         |  |  |  |  |
| 1      | <u> </u>            |                 |  | 100   | _                |                 | CDT Complet  | -                 |         |  |  |  |  |
|        |                     |                 |  | 100   | 2                | 1 1             | SPT Sampler  | 2                 | 4       |  |  |  |  |
|        | -                   |                 |  |   |                  |                 | -52.2  | 2                 |         |  |  |  |  |
|        | -                   |                 |  |   |                  | Ш               |  | 3                 |         |  |  |  |  |
| 1      |                     |                 |  | 93  | 3                |                 | SPT Sampler  | 2                 | 4       |  |  |  |  |
| 1      | -                   |                 | At El53.2 Ft., few wood debris   | 4   |                  |                 | -53.7  | 2                 | -       |  |  |  |  |
| 10     |                     |                 |  | 11000   |                  |                 |  | 2                 |         |  |  |  |  |
| - 1    | -                   |                 |  | 100   | 4                |                 | SPT Sampler  | 2                 | 5.      |  |  |  |  |
| 55.2   | 6.0                 |                 | At El54.7 Ft., 5Y 2.5/2 black  |   |                  | Ш               | -55.2  | 2                 | 4       |  |  |  |  |
|        | - 0.0               |                 | SAND, poorly-graded with silt, mostly  |   |                  | 1 1             | 00.2   | 12                |         |  |  |  |  |
|        |                     |                 | angular to subangular fine-grained<br>sand-sized quartz, few silt, wet, 5Y 5/2 olive   | 87  | 5                | ы               | SPT Sampler  | 14                |         |  |  |  |  |
| 1      | -                   |                 | gray (SP-SM)   | 0.  |                  |                 |  | 17                | 31      |  |  |  |  |
|        | -                   |                 |  | -   | -                |                 | -56.7  | 13                |         |  |  |  |  |
|        | -                   |                 |  | 07  |                  |                 | ODT O  | -                 |         |  |  |  |  |
|        |                     |                 |  | 87  | 6                |                 | SPT Sampler  | 13                | 27      |  |  |  |  |
| 58.2   | 9.0                 |                 | SAND, silty, mostly angular to subangular  | -   |                  |                 | -58.2  | 14                |         |  |  |  |  |
| - 1    |                     | THE             | fine-grained sand-sized quartz, little silt, we  |   |                  |                 |  | _ 5               |         |  |  |  |  |
| 9      | -                   |                 | 5Y 4/2 olive gray (SM)   | 67  | 7                |                 | SPT Sampler  | 5                 | 12      |  |  |  |  |
|        |                     | 1+1+            |  |   |                  | ] ]             | -59.7  | 7                 | 1.5     |  |  |  |  |
|        |                     | 1111            |  | Y   | H                |                 |  | 12                |         |  |  |  |  |
|        | -                   |                 | At El60.2 Ft., 10Y 3/1 very dark greenish  | 100   | 8                |                 | SPT Sampler  | 15                | 43      |  |  |  |  |
| 61.2   | 12.0                |                 | gray   |   |                  |                 | -61.2  | 16                | 31      |  |  |  |  |
|        |                     |                 | NOTES:  1. USACE Jacksonville is the custodian for these original files.  2. Soils are field visually classified in accordance with the Unified Soils Classification System.   | è   |                  |                 | 140# hammer w/30" drop used w<br>2.0' split spoon (1-3/8" I.D. x 2" C  |                   |         |  |  |  |  |

| DRILLING LOG (Cont. Sheet)  Jacksonville District  COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.)  NAD83  LOCATION COORDINATES  X = 526,130 Y = 2,206,770  LELEV. DEPTH  Jacksonville Harbor GRR  LLEVATION TOP OF BORING  -49,2 Ft.  CLASSIFICATION OF MATERIALS  A. Water depth recorded at start of drilling operations and referenced to the tidal station at the Mayport Bar Pilots Dock.  S. Water depth of -50.4 ft. recorded at 08:50 AM on 8126/09. Tide gage reading of +1.2 ft. milw  6. Additional lab test results were added February 2011  7. Laboratory Testing Results  SAMPLE SAMPLE LABORATORY ID DEPTH CLASSIFICATION  1 0.0/1.5 MH*  *Lab visual classification based on gradation curve. No Atterberg limits.   | VERTICAL MLLW  (S No.9: |
|--|-------------------------|
| State Plane, FLE (U.S. Ft.)   NAD83  | MLLW                    |
| CLASSIFICATION OF MATERIALS  X = 526,130 Y = 2,206,770  CLASSIFICATION OF MATERIALS  X = 526,130 Y = 2,206,770  CLASSIFICATION OF MATERIALS  X = 526,130 Y = 2,206,770  CLASSIFICATION OF MATERIALS  X = 526,130 Y = 2,206,770  CLASSIFICATION OF MATERIALS  X = 526,130 Y = 2,206,770  CLASSIFICATION OF MATERIALS  X = 526,130 Y = 2,206,770  Remarks  Remarks  Remarks  3. Set 60.5 ft. of 4" flush joint steel casing  4. Water depth recorded at start of drilling operations and referenced to the tidal station at the Mayport Bar Pilots Dock.  5. Water depth of -50.4 ft. recorded at 08:50 AM on 8/26/09. Tide gage reading of +1.2 ft. milw  6. Additional lab test results were added February 2011  7. Laboratory Testing Results  SAMPLE SAMPLE LABORATORY ID DEPTH CLASSIFICATION  | •                       |
| The state of the s | BLOWS/<br>0.5 FT.       |
| 3. Set 60.5 ft. of 4" flush joint steel casing  4. Water depth recorded at start of drilling operations and referenced to the tidal station at the Mayport Bar Pilots Dock.  5. Water depth of -50.4 ft. recorded at 08:50 AM on 8/26/09. Tide gage reading of +1.2 ft. mllw  6. Additional lab test results were added February 2011  7. Laboratory Testing Results  SAMPLE SAMPLE LABORATORY ID DEPTH CLASSIFICATION DEPTH CLASSIFICATION 1 0.0/1.5 MH*  *Lab visual classification based on gradation   | BLOWS/<br>0.5 FT.       |
| 3. Set 60.5 ft. of 4" flush joint steel casing  4. Water depth recorded at start of drilling operations and referenced to the tidal station at the Mayport Bar Pilots Dock.  5. Water depth of -50.4 ft. recorded at 08:50 AM on 8/26/09. Tide gage reading of +1.2 ft. mllw  6. Additional lab test results were added February 2011  7. Laboratory Testing Results  SAMPLE SAMPLE LABORATORY ID DEPTH CLASSIFICATION   |                         |
| operations and referenced to the tidal station at the Mayport Bar Pilots Dock.  5. Water depth of -50.4 ft. recorded at 08:50 AM on 8/26/09. Tide gage reading of +1.2 ft. mllw  6. Additional lab test results were added February 2011  7. Laboratory Testing Results  SAMPLE SAMPLE LABORATORY ID DEPTH CLASSIFICATION ————————————————————————————————————   |                         |
|  |                         |

| DPII  | LING               | LOG  | DIVISION  | INSTALLATION SHEET 1  |                  |                 |  |                   |         |  |  |  |  |
|-------|--------------------|--|---|---|------------------|-----------------|--|-------------------|---------|--|--|--|--|
|       | 99.9.20            | -00  | South Atlantic  | Jacksonville District OF 2 SHEETS   |                  |                 |  |                   |         |  |  |  |  |
| PROJ  | ECT<br>cksonville  |  | CDD   | 9. SIZE AND TYPE OF BIT See Remarks  10. COORDINATE SYSTEM/DATUM HORIZONTAL VERTICAL        |                  |                 |  |                   |         |  |  |  |  |
| 0.5   | The Control of the |  | R CHANNEL   | 10. 0   |                  |                 |  | MLLW              |         |  |  |  |  |
|       | NG DESIG           |  | NO PER MINISTRALINA   | State Plane, FLE (U.S. Ft.) NAD83 MLLW  11. MANUFACTURER'S DESIGNATION OF DRILL AUTO HAMMER |                  |                 |  |                   |         |  |  |  |  |
|       | 3-JHPMO            |  | X = 527,920 Y = 2,206,000   | Diedrich D-50 Truckrig MANUAL HAMMER  |                  |                 |  |                   |         |  |  |  |  |
|       | ING AGEN           |  | contractor file No.<br>ering & Testing, Inc. 2009D08                                      | D. 12. TOTAL SAMPLES DISTURBED UNDISTURBED (UD)   |                  |                 |  |                   |         |  |  |  |  |
| NAME  | OF DRILL           | ER   |   | 13. T   | DTAL             | NUMB            | ER CORE BOXES 1  |                   |         |  |  |  |  |
|       | TION OF            |  | DEG. FROM BEARING VERTICAL  | 14. ELEVATION GROUND WATER TIDAL  |                  |                 |  |                   |         |  |  |  |  |
| ⊠ VI  | ERTICAL<br>ICLINED |  | VERTICAL  | <b>15. DATE BORING STARTED</b> 08-25-09  08   |                  |                 |  |                   |         |  |  |  |  |
| THICK | (NESS OF           | OVERB  | URDEN N/A   | 16. E   | LEVAT            | TION T          | OP OF BORING -42.9 Ft.   |                   |         |  |  |  |  |
| DEPTI | H DRILLE           | OTNI   | ROCK N/A  |   | ALC: N           | 1000            | VERY FOR BORING 77 %   |                   |         |  |  |  |  |
| TOTAL | L DEPTH            | OF BOR   | ing 19.5 Ft.  | 18. SIGNATURE AND TITLE OF INSPECTOR  V. J. Thompson III, Civil Engineer                    |                  |                 |  |                   |         |  |  |  |  |
|       |                    | 0  | 7.7   | 1   | _                | _               | npsort i i i, Oivii Engineei   | <i>α</i> .•       | =       |  |  |  |  |
| LEV.  | DEPTH              | LEGEND   | CLASSIFICATION OF MATERIALS   | RÉC   | BOX OR<br>SAMPLE | ROD<br>OR<br>UD | REMARKS  | BLOWS/<br>0.5 FT. | N-VALUE |  |  |  |  |
| 42.9  | 0.0                |  | A COLD AND A CONTROL  |   |                  |                 | -42.9  |                   |         |  |  |  |  |
|       |                    | 0 00 0   | SHELL, mostly angular to subangular sand to gravel-sized shell up to 3/8", little angular |   |                  |                 |  | 3                 |         |  |  |  |  |
| -     |                    | 0 00 0   | to subangular medium to coarse-grained  | 80  | 1                |                 | SPT Sampler  | 4                 |         |  |  |  |  |
| 44.4  | 1.5                | 0 00 0   | sand-sized quartz, wet, 5Y 6/1 gray   |   |                  |                 | -44.4  | 5                 | 9       |  |  |  |  |
| -     | 1.0                |  | SAND, poorly-graded, mostly angular to  | - 38  |                  |                 |  | 8                 |         |  |  |  |  |
|       |                    |  | subangular fine to medium-grained<br>sand-sized quartz, some angular to                   | 20  | 2                |                 | SPT Sampler  | 1                 |         |  |  |  |  |
| Ŀ     |                    | subangular shell up to 1", wet, 5Y 6/2 light olive gray (SP) | -   | -   |                  | 37              | 16   | 28                |         |  |  |  |  |
|       | 70                 |  | olive gray (SP)   | -   |                  | 1               | -45.9  | 18                |         |  |  |  |  |
| 4     |                    |  |   | 67  |                  |                 | CDT Complex  | 453               |         |  |  |  |  |
|       |                    |  |   | 67  | 3                |                 | SPT Sampler  | 7                 | 44      |  |  |  |  |
| E     |                    |  |   | -   |                  |                 | -47.4  | 24                |         |  |  |  |  |
| -     | -                  |  | At El47.9 Ft., few angular to subangular  | V   | 10               |                 | Value of the Control  | 12                |         |  |  |  |  |
| Ė     |                    |  | shell up to 1"  | 67  | 4                |                 | SPT Sampler  | -                 | 33      |  |  |  |  |
| L     | 4                  |  |   | 9   |                  |                 | -48.9  | 18                | 100     |  |  |  |  |
| -     |                    |  |   |   | N                |                 |  | 10                |         |  |  |  |  |
|       |                    |  | At El49.7 Ft., some angular to subangular   | 73  | 5                |                 | SPT Sampler  | 13                | 25      |  |  |  |  |
| E     |                    |  | shell up to 1/2"  | 100   |                  |                 | -50.4  | 12                | 20      |  |  |  |  |
| -     |                    |  |   |   |                  |                 |  | 21                |         |  |  |  |  |
| 4     |                    | • : • `  | ∽At El50.9 Ft., few angular to subangular shell up to 3/8"                                | 73  | 6                |                 | SPT Sampler  | 17                | 20      |  |  |  |  |
| 51.9  | 9.0                |  |   |   |                  |                 | -51.9  | 13                | 30      |  |  |  |  |
| 25    |                    |  | SAND, poorly-graded with silt, mostly angular to subangular fine-grained                  | - 48  |                  |                 |  | 10                |         |  |  |  |  |
| F     |                    | ::!!   | sand-sized quartz, some angular to  | 60  | 7                |                 | SPT Sampler  | 10                | 200     |  |  |  |  |
| 53.4  | 10.5               | .:   | subangular shell up to 1/2", few silt, moist, 5Y 4/1 dark gray (SP-SM)                    |   |                  |                 | -53.4  | 12                | 22      |  |  |  |  |
| -     | 10.0               |  | SAND, poorly-graded, mostly angular to  | 7   |                  |                 |  | 13                |         |  |  |  |  |
| F     |                    |  | subangular fine-grained sand-sized quartz, few angular to subangular shell up to 1/8",    | 73  | 8                |                 | SPT Sampler  | - 00              |         |  |  |  |  |
|       | 10.0               |  | moist, 5Y 6/1 gray (SP)   |   |                  |                 | The many take  | 11                | 23      |  |  |  |  |
| 54.9  | 12.0               | 11   | CLAY, fat, medium plasticity, firm, moist,  |   |                  |                 | -54.9  | 4                 |         |  |  |  |  |
| -     |                    |  | 5GY 4/1 dark greenish gray (CH)   | 93  | 9                |                 | ODT Complet  | _                 |         |  |  |  |  |
|       |                    |  |   | 93  | 9                |                 | SPT Sampler  | Daniel Control    | 4       |  |  |  |  |
| -     |                    |  |   | 0   |                  |                 | -56.4  | 2                 |         |  |  |  |  |
|       | ,                  |  |   | l lufat-  | V plant          |                 | A Property of the Control of the Con | _ 2               |         |  |  |  |  |
|       |                    |  |   | 100   | 10               |                 | SPT Sampler  | -                 | 6       |  |  |  |  |
| -     |                    |  |   |   |                  |                 | -57.9  | 3                 |         |  |  |  |  |

| DR     | ILLING      | LOC     | G (Cont. Sheet)   | Jackso  |       |                  |                 | <u> </u> | Iation CD-3111                             | s                  | SHEET 2<br>OF 2 SI | IEETS   |                       |
|--------|-------------|---------|---|---|-------|------------------|-----------------|----------|--|--------------------|--------------------|---------|-----------------------|
| PROJEC | т           |         |   | COORDINA  |       |                  |                 | UM       | HORIZONTAL                                 | VERTI              |                    |         | 1                     |
| Jack   | sonville Ha | arbor ( | GRR   | State F   | lane, | FLE              | (U.S            | Ft.)     | NAD83                                      | ML                 | LW                 |         |                       |
| LOCATI | ON COORDI   | NATES   | 3   | ELEVATIO  | N TOP | OF E             | ORIN            | G        |  |                    |                    |         |                       |
| X = !  | 527,920     | Y = 2   | ,206,000  | -42.9 F   | _     |                  |                 | •        |  |                    |                    |         |                       |
| ELEV.  | DEPTH       | LEGEND  | CLASSIFICATION OF MATERIA   | LS  | REC.  | BOX OR<br>SAMPLE | RQD<br>OR<br>UD |          | REMARK                                     | S                  | BLOWS/<br>0.5 FT.  | N-VALUE | 15                    |
|        |             |         |   |   | 100   | 11               |                 | -59.4    | SPT Samp                                   | oler               | 2 2 2              | 4       | -<br>-<br>-<br>-<br>- |
|        |             |         |   |   | 100   | 12               |                 | -60.9    | SPT Samp                                   | oler               | 1<br>2<br>2        | 4       | -<br>-<br>-<br>-      |
| -62.4  | 19.5        |         |   |   | 100   | 13               |                 | -62.4    | SPT Samp                                   | oler               | 2 2 2              | 4       | -                     |
| -027   |             |         | NOTES:  1. USACE Jacksonville is the custof these original files.  2. Soils are field visually classified accordance with the Unified Soils Classification System.  3. Set 57.5 ft. of 4" flush joint steel  4. Water depth recorded at start of operations and referenced to the tid at the Mayport Bar Pilots Dock.  5. Water depth of -48.0 ft. recorded PM on 8/25/09. Tide gage reading of millw  6. Additional lab test results were a February 2011  7. Laboratory Testing Results  SAMPLE SAMPLE LABORA ID DEPTH CLASSIFICATION DEPTH CLASSIFICATION SP-S  *Lab visual classification based on grouve. No Atterberg limits. | casing drilling lal station d at 13:00 of +5.1 ft. added ATORY CATION |       |                  |                 | 140# ha  | mmer w/30" drop us<br>spoon (1-3/8" I.D. x | ed with<br>2" O.D. | ).                 |         |                       |

|                |                   |          |           | Du de:             | 0.01                                       |                          | LINIO    | T A • •   |                  |                 | g Designation                            | CD-JHPIVIUS      |                          |         |
|----------------|-------------------|----------|-----------|--------------------|--|--------------------------|----------|-----------|------------------|-----------------|--|------------------|--------------------------|---------|
| DRI            | LLING             | LC       | )G        | DIVISION           | on<br>uth Atlantic                         |                          | 1        |           | LATIC<br>sonv    |                 | istrict                                  |                  | SHEET 1<br>OF 3 SH       | IEETS   |
| 1. PRC         | JECT              |          |           |                    |  |                          | -        |           |                  |                 |  | Remarks          | 0 31                     |         |
|                | lacksonvill       | le H     | arb       | or Genera          | l Reevaluation Re                          | eport (GRR)              | 10.      | СО        | ORDI             | NATE            | SYSTEM/DATUM                             | HORIZONTAL       | VERTICAL                 |         |
|                |                   |          |           | WIDENE             |  |                          | <u> </u> |           |                  |                 | ne, FLE (U.S. Ft.)                       |                  | MLLW                     |         |
|                | RING DESIG        |          |           | <b>1</b> i         | LOCATION COOR                              | DINATES<br>Y = 2,200,417 | 11.      |           |                  |                 | RER'S DESIGNATIO<br><b>)-50 Truckrig</b> |                  | AUTO HAMME<br>MANUAL HAM |         |
|                | LLING AGE         |          |           |                    |  | TTRACTOR FILE NO.        | 10       |           |                  |                 | 1:                                       |                  | NDISTURBED               |         |
| (              | Challenge         | Eng      | jine      | ering & Te         | esting, Inc. 2                             | 009D08                   | 12.      | 10        | TALS             | SAMPI           | LES                                      | 28               | 0                        |         |
|                | ME OF DRIL        |          |           |                    |  |                          | 13.      | ТО        | TAL N            | IUMB            | ER CORE BOXES                            | 0                |                          |         |
| 5. DIR         | ECTION OF         | BO       |           | G                  | DEG. FROM                                  | BEARING                  | 14.      | ELI       | EVAT             | ION G           | ROUND WATER                              | TIDAL            |                          |         |
|                | VERTICAL INCLINED |          |           |                    | VERTICAL                                   |                          | 15.      | DA        | TE BO            | DRING           | ò  | STARTED 01-22-10 | 01-22-1                  |         |
|                | CKNESS OF         | F OV     | FRE       | BURDEN             | N/A  | - <b>:</b>               | 16       | FI        | FVAT             | ION T           | OP OF BORING                             | -18.4 Ft.        | 1 0122                   |         |
|                |                   |          |           |                    |  |                          | —        |           |                  |                 | VERY FOR BORING                          |                  |                          |         |
| 7. DEF         | TH DRILLE         | ED IN    | 110       |                    | N/A  |                          | 18.      |           |                  |                 | AND TITLE OF INSF                        |                  |                          |         |
| 8. TOT         | AL DEPTH          | OF E     | BOR       | RING 4             | 5.3 Ft.                                    |                          | <u>L</u> |           | V. J.            | Thon            | npson III, Civil I                       | Engineer         |                          |         |
| ELEV.          | DEPTH             | <u> </u> | LEGEND    | CI                 | LASSIFICATION OF                           | MATERIALS                | RI       | %<br>EC.  | BOX OR<br>SAMPLE | RQD<br>OR<br>UD |  | REMARKS          | BLOWS/<br>0.5 FT.        | N-VALUE |
| , = .          |                   | +        | $\dashv$  |                    |  |                          | $\top$   | $\exists$ |                  |                 | 40 :                                     |                  |                          | Γ_      |
| -18.4<br>-18.6 |                   | -        | <u> </u>  | SILT, ord          | ganic-L, nonplasti                         | c, soft, wet,            |          | $\dashv$  |                  |                 | -18.4                                    |                  |                          |         |
|                | F                 |          | ∄∄        | \5Y 2.5/1          | black (OL) coorly-graded with              |                          | _/  ַ    | _         | 4                |                 |  | CDT Carrate      |                          | 1       |
|                | F                 | :-       |           | angular t          | to subangular fine                         | e-grained                |          | 27        | 1                |                 |  | SPT Sampler      | 1                        | 2       |
|                | -                 |          | 111       | sand-size          | ed quartz, few sili<br>lar shell up to 1/4 | t, trace angular to      | $\vdash$ | $\dashv$  |                  |                 | -19.9                                    |                  | 1                        |         |
|                | Ė.                |          |           | \ 5Y 2.5/1         | black (SP-SM)                              |                          |          |           |                  |                 |  |                  | 1                        | -       |
|                | -                 | .        | 11        | 5Y 4/2 ol          | 0.2 Ft., little silt, d<br>live gray       | iscontinue snell,        | 7        | 73        | 2                |                 |  | SPT Sampler      | 2                        | 4       |
|                | Ļ                 |          |           |                    | 1.4 Ft., moist                             |                          | $\perp$  | _         |                  |                 | -21.4                                    |                  | 2                        |         |
|                | -                 |          |           | -Al El2 I          | 1.4 Ft., Moist                             |                          |          |           |                  |                 |  |                  | 2                        |         |
|                | L                 | .:       |           |                    |  |                          | 9        | 93        | 3                |                 |  | SPT Sampler      | 2                        | 3       |
|                | <u> </u>          |          |           |                    |  |                          | L        |           |                  |                 | -22.9                                    |                  | 1                        | Ĺ       |
|                | Ŀ                 |          | ╢╢        |                    |  |                          |          |           |                  |                 |  |                  | 2                        |         |
|                | -                 | :-       | 111       | At El23            | 3.4 Ft., 5Y 4/1 da                         | rk gray                  | 6        | 67        | 4                |                 |  | SPT Sampler      | 2                        | 4       |
|                | Ŀ                 |          | 111       |                    |  |                          |          |           |                  |                 | -24.4                                    |                  | 2                        |         |
|                | E                 |          |           |                    |  |                          |          |           |                  |                 |  |                  | 2                        |         |
|                | Ł                 |          | <u> </u>  |                    |  |                          | 8        | 87        | 5                |                 |  | SPT Sampler      | 1                        | 3       |
|                | -                 |          |           |                    |  |                          |          |           |                  |                 | -25.9                                    |                  | 2                        | ٦       |
|                | F                 |          |           | At El25 shell up t |  | ular to subangular       |          |           |                  |                 |  |                  | 3                        |         |
|                | F                 | -:       | 111       | 0.10 up 1          |  |                          | 16       | 67        | 6                |                 |  | SPT Sampler      | 2                        | ] _     |
|                | F                 |          | 11        |                    |  |                          |          |           |                  |                 | -27.4                                    |                  | 3                        | 5       |
|                | F                 | :        | ╁┼        | `At El27           | 7.4 Ft., discontinu                        | ie shell                 |          |           |                  |                 |  |                  | 2                        |         |
|                | F                 | :-       |           |                    |  |                          | 6        | 67        | 7                |                 |  | SPT Sampler      | 2                        | 1.      |
|                | F                 |          | ∄         |                    |  |                          |          |           |                  |                 | -28.9                                    |                  | 2                        | 4       |
|                | F                 |          |           |                    |  |                          |          | $\exists$ |                  |                 |  |                  | 2                        |         |
|                | F                 |          |           |                    |  |                          | 8        | 80        | 8                |                 |  | SPT Sampler      | 2                        | 1       |
|                | ļ.                |          |           |                    |  |                          |          |           |                  |                 | -30.4                                    |                  | 2                        | 4       |
|                | <del> -</del>     | :·       |           |                    |  |                          |          | $\dashv$  |                  |                 | JU. <del>T</del>                         |                  | 2                        |         |
|                | ţ                 | .:       |           |                    |  |                          |          | 93        | 9                |                 |  | SPT Sampler      |                          | †       |
|                | <u> </u>          |          |           |                    |  |                          | `        |           |                  |                 | 04.0                                     | 5 Gampioi        | 1                        | 3       |
|                | ŀ                 |          | ╢╢        | `At El3⁴           | 1.9 Ft., trace and                         | ular to subangular       | $\vdash$ | $\dashv$  |                  |                 | -31.9                                    |                  | 4                        |         |
|                | F                 | :-       |           |                    | to 1/8", 5GY 6/1 (                         |                          | ,        | ,         | 10               |                 |  | CDT Comple       |                          | -       |
|                | F                 | .:       |           |                    |  |                          |          | 87        | 10               |                 |  | SPT Sampler      | 2                        | 11      |
|                | OPM 19            | <u> </u> | $\coprod$ |                    |  |                          |          |           |                  |                 | -33.4                                    | (Continued)      | 9                        |         |

| DRI    | LLINC   | G LC                 | )G               | (Cont. Sheet)  | INSTALL        |                     |                  |                 | 9 003 | gnation CB-JHPIV   | SHEET 2           |         | 1               |
|--------|---------|----------------------|------------------|--|----------------|---------------------|------------------|-----------------|-------|--|-------------------|---------|-----------------|
| PROJEC |         |                      |                  | ·  | COORDI         | sonville<br>NATE S' |                  |                 | UM    | !<br>! HORIZONTAL  | OF 3 SI           | HEETS   | 1               |
|        |         | Harbo                | r G              | General Reevaluation Report (GRR)  | 1              | Plane,              |                  |                 |       | NAD83  | MLLW              |         |                 |
|        | ON COOR |                      |                  |  | ELEVAT         |                     | OF E             | BORIN           | G     |  |                   |         |                 |
| X = 4  | 184,628 | $\overline{}$        | $\neg$           | 200,417  | -18.4          | Ft.                 |                  |                 |       |  |                   | 111     | -               |
| ELEV.  | DEPTH   | LEGEND               |                  | CLASSIFICATION OF MATERIAL   | LS             | %<br>REC.           | BOX OR<br>SAMPLE | RQD<br>OR<br>UD |       | REMARKS  | BLOWS/<br>0.5 FT. | N-VALUE | 45              |
|        |         |                      |                  |  |                |                     |                  |                 |       |  | 6                 |         | 15              |
|        |         | .:                   |                  | `At El34.4 Ft., 2.5Y 5/4 light olive b                                   | rown           | 87                  | 11               |                 |       | SPT Sample   |                   | 4       | Ļ               |
|        |         |                      |                  | 7. L. 0 1. 11 t., 2.0 1 0/1 light onvo s                                 |                | -                   |                  |                 | -34.9 |  | 1                 |         | ŧ               |
|        |         |                      |                  |  |                | 100                 | 12               |                 |       | SPT Sample   |                   | -       | F               |
|        |         |                      | 1                |  |                |                     | '-               |                 | -36.4 | or r campi   | 1                 | 2       | ŀ               |
|        |         |                      |                  |  |                |                     |                  |                 | -30.4 |  | 1                 |         | ŧ               |
|        |         |                      |                  |  |                | 100                 | 13               |                 |       | SPT Sample   | er 1              | ٦ ,     | ŀ               |
|        |         |                      |                  |  |                |                     |                  |                 | -37.9 |  | 2                 | 3       | F               |
|        |         |                      |                  | ►At El37.9 Ft., 10YR 4/4 dark yello<br>brown                             | wish           |                     |                  |                 |       |  | 2                 |         | L<br>-20        |
|        |         |                      |                  |  |                | 93                  | 14               |                 |       | SPT Sample   | er <u>4</u>       | 7       | F 20            |
|        |         | .:                   |                  |  |                |                     |                  |                 | -39.4 |  | 3                 |         | Ļ               |
|        |         |                      |                  |  |                |                     | ۱,,              |                 |       | ODT 0  | 3                 | -       | F               |
|        |         |                      |                  |  |                | 80                  | 15               |                 |       | SPT Sample   | er <u>2</u><br>2  | 4       | F               |
|        |         |                      |                  |  |                |                     |                  |                 | -40.9 |  | 2                 |         | £               |
|        |         |                      |                  |  |                | 80                  | 16               |                 |       | SPT Sample   |                   | 1       | F               |
|        |         |                      |                  |  |                |                     |                  |                 | -42.4 | ·  | 3                 | 5       | -               |
|        |         |                      |                  |  |                |                     |                  |                 |       |  | 3                 |         | F               |
|        |         |                      |                  |  |                | 87                  | 17               |                 |       | SPT Sample   | er 1              | 3       |                 |
| -43.9  | 25.5    |                      |                  | LINATOTONIT  |                |                     |                  |                 | -43.9 |  | 2                 |         | <u> </u>        |
|        |         | TIT IT               | I                | LIMESTONE, sandy, soft, highly we fine grained, moist, 5Y 7/4 pale yello | atnered,<br>ow |                     |                  |                 |       |  | 3                 |         | Ŀ               |
|        |         | I I I                | I                |  |                | 73                  | 18               |                 |       | SPT Sample   |                   | 10      | ŀ               |
|        |         |                      | I                |  |                | -                   |                  |                 | -45.4 |  | 3                 |         | ŧ               |
|        |         | P I I                | Ī                |  |                | 67                  | 19               |                 |       | SPT Sample   |                   | -       | E               |
|        |         | I Veath              | I                |  |                | "                   | '                |                 | -46.9 | or roamp.  | 15                | 21      | -               |
|        |         | Highly Weathered     | I                | At El46.9 Ft., very soft, 2.5Y 7/6 y                                     | ellow          |                     |                  |                 | 40.5  |  | 6                 |         | ‡               |
|        |         | I II                 | I                |  |                | 60                  | 20               |                 |       | SPT Sample   | er 4              | 16      | F               |
|        |         | I I I                | Ī                |  |                |                     |                  |                 | -48.4 |  | 12                | 16      | F <sub>30</sub> |
|        |         | I I I                | I                |  |                |                     | <b> </b>         |                 |       | 007.0  | 4                 |         | - 30            |
|        | ,       | ¥Iŧ                  | I                | ≻At El49.4 Ft., sparsely fossiliferou                                    | •              | 69                  | 21               |                 | 40.7  | SPT Sample   |                   | 61+     | Ŀ               |
|        |         | TIT I                | I                | moderately hard, slightly weathered                                      | 3,             |                     | $\vdash$         |                 | -49.7 |  | 50/0.3            | +       | ‡               |
| -51.7  | 33.3    | Slightly Weathered — | I                | ≻LIMESTONE, sandy, soft  |                | 50                  | Run<br># 1       | RQD<br>0        |       | 4 x 5-1/2" Diamond Imp<br>DT = 1 min<br>HP = 300 p<br>DFR = 20 % | s<br>si           |         | -               |
| SALE   |         |                      | I<br>I<br>I<br>I |  |                |                     |                  |                 |       |  |                   |         |                 |

| DRILLING LO                               | G (Cont. Sheet)  | INSTALLAT  |      |                  | ict             |  | SHEET<br>OF 3                                       |         |
|---|--|--|------|------------------|-----------------|--|---|---------|
| PROJECT                                   |  | COORDINA   |      |                  |                 | JM HORIZONTAL  | VERTICAL  | SHEETS  |
|   | General Reevaluation Report (GRR)  | State P  |      |                  | `               | · ·  | MLLW  |         |
| LOCATION COORDINATE $X = 484,628$ $Y = 2$ | 2,200,417  | ELEVATION<br>-18.4 Ft                                      |      | OF E             | ORIN            | 3  |   |         |
| ELEV. DEPTH                               | CLASSIFICATION OF MATERIAL   |  | REC. | BOX OR<br>SAMPLE | RQD<br>OR<br>UD | REMA   | DE COMS/<br>0.5 FT.                                 | N-VALUE |
| ¥ 111                                     | At El53.7 Ft., sparsely fossiliferous moderately hard, solid, 5Y 8/4 pale y  At El54.7 Ft., very soft, highly wear   | ellow  | 50   | Run<br># 1       | RQD<br>0        | DT = 1   | d Impregnated Bit<br>1 mins<br>800 psi<br>= 20 % 20 |         |
| eathered                                  |  |  | 80   | 22               |                 | SPT S<br>-56.2   | ampler 49<br>18                                     | 67      |
| -57.7 39.3 V                              |  |  | 87   | 23               |                 | SPT S  | 14 ampler 11 12                                     | 23      |
| -31.1 39.3 1 121                          | SAND, poorly-graded with silt, mostly angular to subangular fine to medium-grained sand-sized quartz, trace angular to subangular shell up moist, 5Y 7/4 pale yellow (SP-SM)   | few silt,  | 67   | 24               |                 |  | 2 ampler 3 4  | 7       |
| -60.7   42.3                              | At El60.2 Ft., weak cementation  |  | 87   | 25               |                 | SPT S  | 5 ampler 10   | 28      |
| -60.7 42.3                                | SAND, poorly-graded, mostly angula<br>subangular fine-grained sand-sized of<br>moist, weak cementation, 5Y 8/2 pal<br>(SP)   | quartz,  | 87   | 26               | ,               | -60.7<br>SPT S   | 30<br>ampler 30<br>39                               | 69      |
| -63 7 45 3                                | At El62.2 Ft., trace phosphate, 5Y gray  | ŭ  | 100  | 27               |                 | SPT S  | 17 ampler 27 50                                     | 77      |
| -63.7 45.3                                | NOTES:  1. USACE Jacksonville is the custor these original files.  2. Soils are field visually classified in accordance with the Unified Soils Classification System.  3. Set 65.5 ft. of 6" flush joint steel of the depth recorded at start of the operations and referenced to the tidate at the Blount Island Terminal.  5. Water depth of -19.1 ft. recorded AM on 1/22/2010. Tide gage reading ft. mllw  6. Laboratory Testing Results  SAMPLE SAMPLE LABORATID DEPTH CLASSIFIC 2 1.5/3.0 SP-SM  *Lab visual classification based on g curve. No Atterberg limits. | casing drilling al station at 08:19 g of +0.7  TORY CATION |      |                  |                 | -63.7  140# hammer w/30" dro 2.0' split spoon (1-3/8" I. Abbreviations:     DT = Drill Time.     HP = Hydraulic Press     DFR = Drill Fluid Retu | p used with<br>D. x 2" O.D.).<br>ure.               |         |

# Grain Size Analysis - Mechanical

| Project            | USACE- Jacksonville District |  |  |  |  |  |  |  |
|--------------------|------------------------------|--|--|--|--|--|--|--|
| Laboratory Name    | Dames & Moore - Atlanta      |  |  |  |  |  |  |  |
| Visual Description | of Soil                      |  |  |  |  |  |  |  |
|                    | Poorly Graded Sand           |  |  |  |  |  |  |  |
| Reaction to HCL    | WEAK                         |  |  |  |  |  |  |  |
|                    |                              |  |  |  |  |  |  |  |

| Weight of Soil and Dish:          | 432.25 |
|-----------------------------------|--------|
| Dry Weight Soil and Dish:         | 313.16 |
| Weight Dish:                      | 8.99   |
| Total Weight:                     | 304.17 |
| Weight Soil & Dish after Washing: | 300.24 |
| Weight of Oven Dry after Washing  | 291.25 |

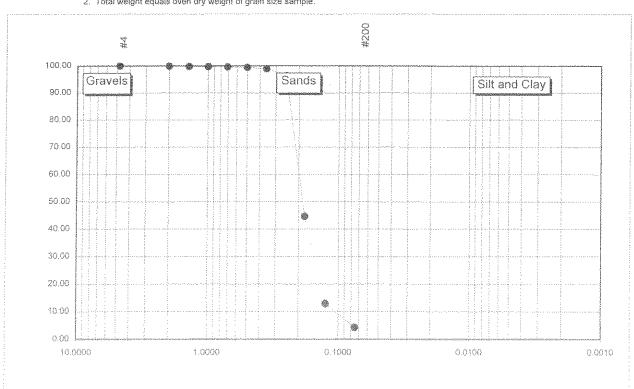
| Location               | Jacksonville Harbor |
|------------------------|---------------------|
| Boring No.             | CB-JH99-16          |
| Sample No.             | 1                   |
| Elev. of Sample (ft.): | -39:6 To -40.1      |
| Date of Testing:       | 10-Dec-99           |
| Est. Percent Shell:    | <1%                 |

| 10% Passing - D10        | 0.110 | Nonico.                 |
|--------------------------|-------|-------------------------|
| 30% Passing - D30        | 0.170 | Management              |
| 60% Passing - D60        | 0.200 | Michaele                |
| Coef. Of Uniformity - Cu | 1.82  | Participant of the last |
| Coef. Of Curvature - Cc  | 1.31  | designation             |
| Classification:          | SP    | Secondary of            |

|           | , | Individual<br>Weight | Cumulative<br>Weight | Cumulative<br>Percent | Cumulative<br>Percent |
|-----------|---|----------------------|----------------------|-----------------------|-----------------------|
| Sieve No. | Size (mm)                               | Retained             | Retained             | Retained              | Finer Passing         |
| #4        | 4.7500                                  | 0.01                 | 0.01                 | 0.00                  | 100.00                |
| #10       | 2.0000                                  | 0.33                 | 0.34                 | 0.11                  | 99.89                 |
| #14       | 1.4000                                  | 0.30                 | 0.64                 | 0.21                  | 99.79                 |
| #18       | 1.0000                                  | 0.20                 | 0.84                 | 0.28                  | 99.72                 |
| #25       | 0.7100                                  | 0.40                 | 1.24                 | 0.41                  | 99.59                 |
| #35       | 0.5000                                  | 0.57                 | 1.81                 | 0.60                  | 99.40                 |
| #45       | 0.3550                                  | 1.52                 | 3,33                 | 1.09                  | 98.91                 |
| #60       | 0.2500                                  | 8.01                 | 11.34                | 3.73                  | 96.27                 |
| #80       | 0.1800                                  | 157.21               | 168.55               | 55.41                 | 44.59                 |
| #120      | 0.1250                                  | 96.40                | 264.95               | 87.11                 | 12.89                 |
| #200      | 0.0750                                  | 26.19                | 291.14               | 95.72                 | 4.28                  |
| Pan       |   | 0.11                 | 304.17               | 100,00                | 0.00                  |

Notes:

- 1. All weights in grams.
- 2. Total weight equals oven dry weight of grain size sample.



# Grain Size Analysis - Mechanical

| Project               | USACE- Jacksonville District |  |  |
|-----------------------|------------------------------|--|--|
| Laboratory Name       | Dames & Moore - Atlanta      |  |  |
| Visual Description of | Soil                         |  |  |
|                       | Silty Sand with Gravel       |  |  |
| Reaction to HCL       | WEAK                         |  |  |
| Tested By:            | DE.I                         |  |  |

| Weight of Soil and Dish:          | 389.45 |
|-----------------------------------|--------|
| Dry Weight Soil and Dish:         | 275.40 |
| Weight Dish:                      | 8.51   |
| Total Weight:                     | 266.89 |
| Weight Soil & Dish after Washing: | 195.85 |
| Weight of Oven Dry after Washing  | 187.34 |

| Location               | Jacksonville Harbor |
|------------------------|---------------------|
| Boring No.             | CB-JH99-16          |
| Sample No.             | 2                   |
| Elev. of Sample (ft.): | -41.1 To -41.6      |
| Date of Testing:       | 10-Dec-99           |
| Est. Percent Shell:    | <1%                 |

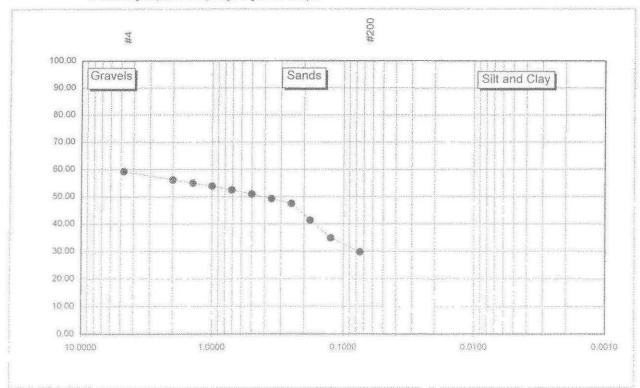
| Classification:                                     | SM    |
|---|-------|
| Goef. Of Uniformity - Cu<br>Coef. Of Curvature - Cc |       |
| 60% Passing - D60                                   |       |
| 30% Passing - D30                                   | 0.080 |
| 10% Passing - D10                                   |       |

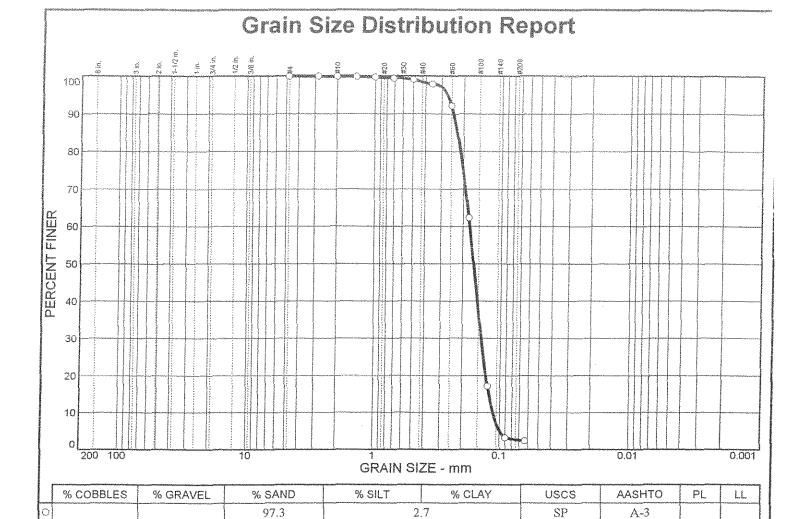
| Sieve No. | Size (mm) | Individual<br>Weight<br>Retained | Cumulative<br>Weight<br>Retained | Cumulative<br>Percent<br>Retained | Cumulative<br>Percent<br>Finer Passing |
|-----------|-----------|----------------------------------|----------------------------------|-----------------------------------|--|
| #4        | 4.7500    | 108.95                           | 108.95                           | 40.82                             | 59.18                                  |
| #10       | 2.0000    | 8.10                             | 117.05                           | 43.86                             | 56.14                                  |
| #14       | 1.4000    | 3.26                             | 120.31                           | 45.08                             | 54.92                                  |
| #18       | 1.0000    | 2.96                             | 123.27                           | 46.19                             | 53.81                                  |
| #25       | 0.7100    | 3.70                             | 126.97                           | 47.57                             | 52.43                                  |
| #35       | 0.5000    | 4.22                             | 131.19                           | 49.16                             | 50.84                                  |
| #45       | 0.3550    | 4.33                             | 135.52                           | 50.78                             | 49.22                                  |
| #60       | 0.2500    | 4.74                             | 140.26                           | 52.55                             | 47.45                                  |
| #80       | 0.1800    | 16.35                            | 156.61                           | 58.68                             | 41.32                                  |
| #120      | 0,1250    | 17.01                            | 173.62                           | 65.05                             | 34.95                                  |
| #200      | 0.0750    | 13.72                            | 187.34                           | 70.19                             | 29.81                                  |
| Pan       |           | 0.00                             | 266.89                           | 100.00                            | 0.00                                   |

Notes:

1. All weights in grams

2. Total weight equals oven dry weight of grain size sample.





| SIEVE  | PERCENT FINER |            |  |  |
|--|---------------|------------|--|--|
| inches<br>size   | 0             |            |  |  |
|  |               |            |  |  |
| Angeronthinan  |               |            |  |  |
| Model Landson  |               |            |  |  |
| - Carallel Control Con |               |            |  |  |
|  |               |            |  |  |
|  | (             | GRAIN SIZE | ************************************** |  |
| D <sub>60</sub>  | 0.177         |            |  |  |
| D <sub>30</sub>  | 0.141         |            |  |  |
| D <sub>10</sub>  | 0.113         |            |  |  |
|  | COEFFICIENTS  |            |  |  |
| C <sub>c</sub>   | 0.99          |            |  |  |
| C <sub>c</sub>   | 1.56          |            |  |  |

| SIEVE   | PE   | RCENT FIN | IER |
|---|--|-----------|-----|
| number<br>size  | 0  |           |     |
| #4<br>#70<br>#14<br>#125<br>#435<br>#450<br>#800<br>#120<br>#1230 | 100.0<br>100.0<br>99.9<br>99.9<br>99.7<br>99.5<br>99.1<br>97.9<br>92.1<br>62.3<br>17.1<br>3.2<br>2.3 |           |     |

| William VA      |  |
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| REMARKS:        |  |
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|                 |  |
|                 |  |

O'SAND, fine quartz, gray-brown

SOIL DESCRIPTION

O Source: CB JHOO-3

Sample No.: 1

Law Engineering and

Environmental Services, Inc.

Client: US Army Corp of Engineers

Project: Jacksonville Harbor

Project No.: 40521-8-8051-28

# 

| - Accession | % COBBLES | % GRAVEL | % SAND | % SILT | % CLAY | USCS  | AASHTO | PL | LL                       |
|-------------|-----------|----------|--------|--------|--------|-------|--------|----|--------------------------|
|             |           |          | 90.4   | 9.     | .2     | SP-SM | A-3    |    |                          |
| менто       |           |          |        |        |        |       |        |    | a distance of the second |
| No.         |           |          |        |        |        |       |        |    |                          |

GRAIN SIZE - mm

|  | SIEVE  | PE   | RCENT FINER  |
|--|--|--|--|
|  | ìnches<br>size   | 0  |  |
|  |  |  |  |
|  |  |  |  |
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|  |  |  |  |
| A CONTRACTOR OF THE PERSON OF  |  | (  | GRAIN SIZE   |
| The state of the s | D <sub>60</sub>  | 0.164  |  |
| 000000000000000000000000000000000000000  | D <sub>30</sub>  | 0.129  |  |
| august and designation   | D <sub>10</sub>  | 0.0881   |  |
| O Commonway page   |  | CC   | EFFICIENTS   |
| /Agricultures (1) The  | C <sub>C</sub><br>Cu   | 1.15   |  |
| Scotterense  | Cu   | 1.86   |  |
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|---|--|---|--|--|--|
| SIEVE   | PERCENT FINER  |   |  |  |  |
| number<br>size  | 0  |   |  |  |  |
| #4<br>#7<br>#10<br>#14<br>#18<br>#25<br>#45<br>#460<br>#120<br>#120<br>#230 | 99.6<br>99.3<br>99.1<br>98.9<br>98.6<br>98.2<br>97.5<br>94.1<br>70.8<br>27.1<br>10.1<br>8.4  |   |  |  |  |

| -               | 0 | SAND, | fine | quartz, | trace | silt, |
|-----------------|---|-------|------|---------|-------|-------|
| Promote Con-    |   | light | gray |         |       |       |
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SOIL DESCRIPTION

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| O Depth 41.5-42.0  |  |
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o Source: CB JHOO-3

Sample No.: 2

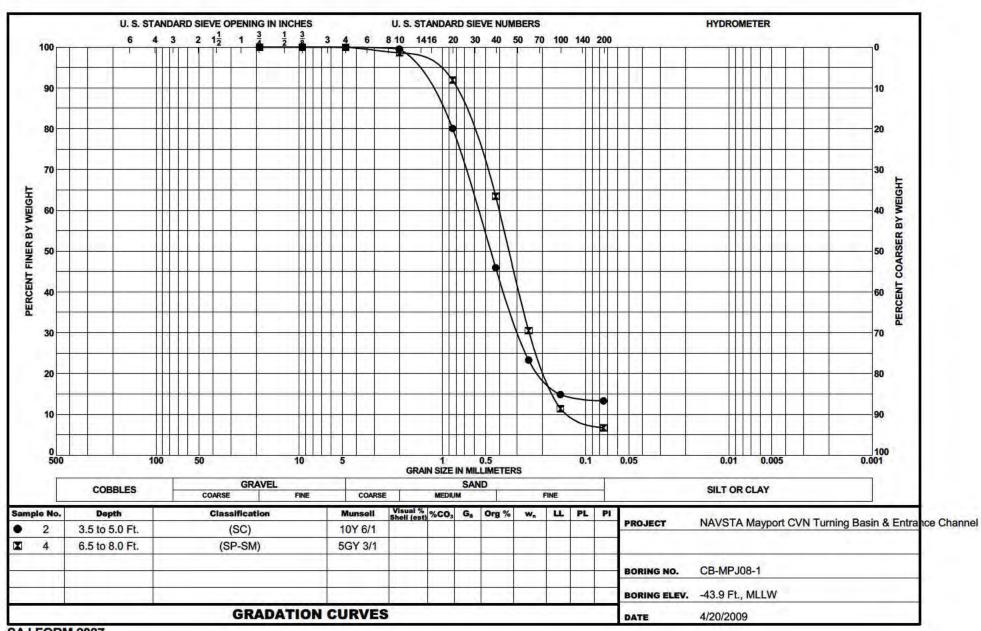
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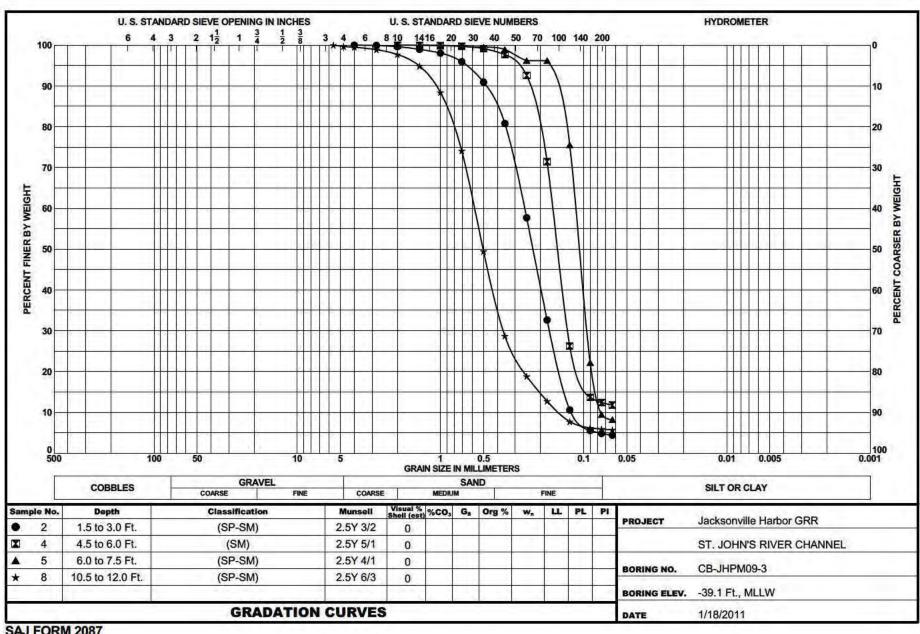
**Environmental Services, Inc.** 

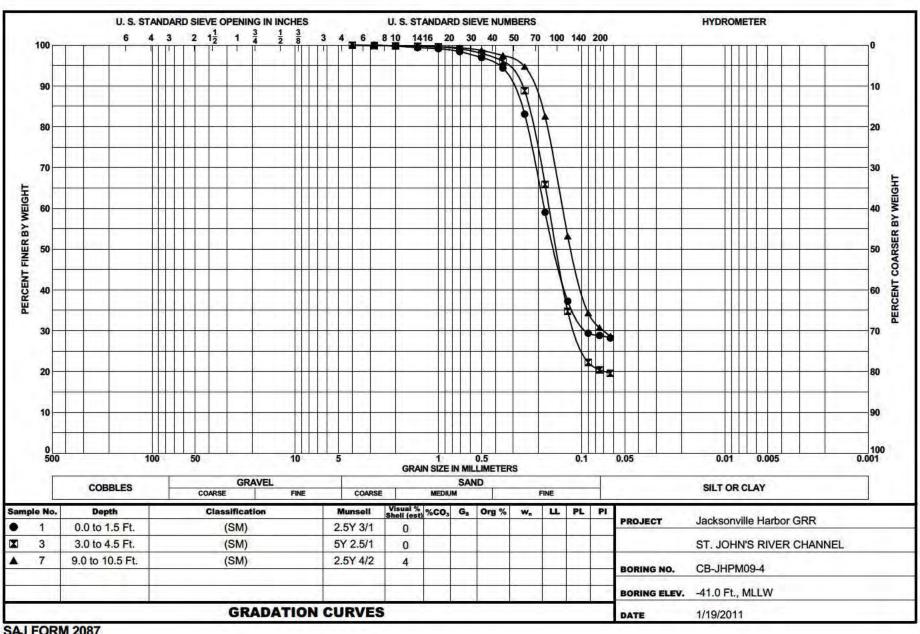
Client: US Army Corp of Engineers

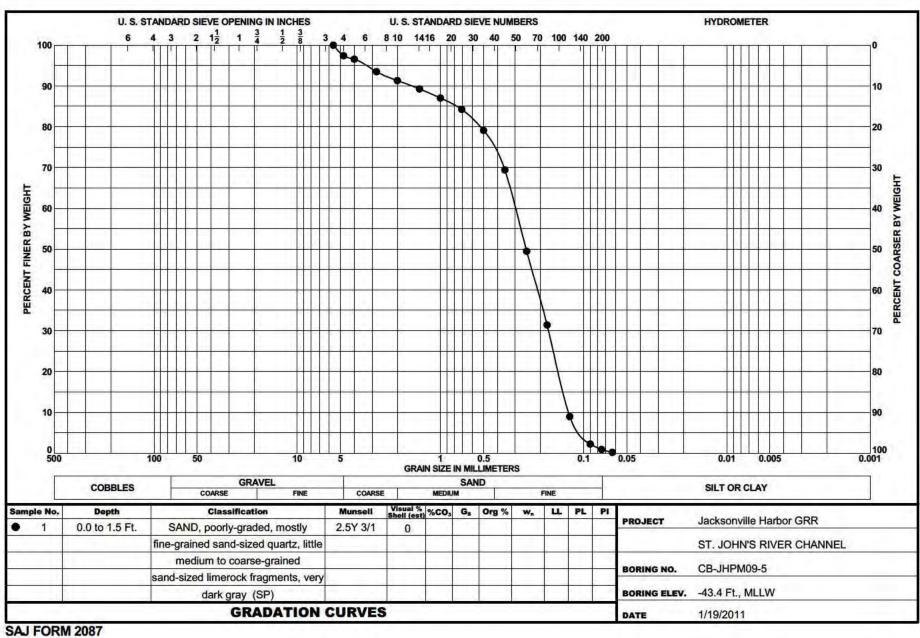
Project: Jacksonville Harbor

Project No.: 40521-8-8051-28

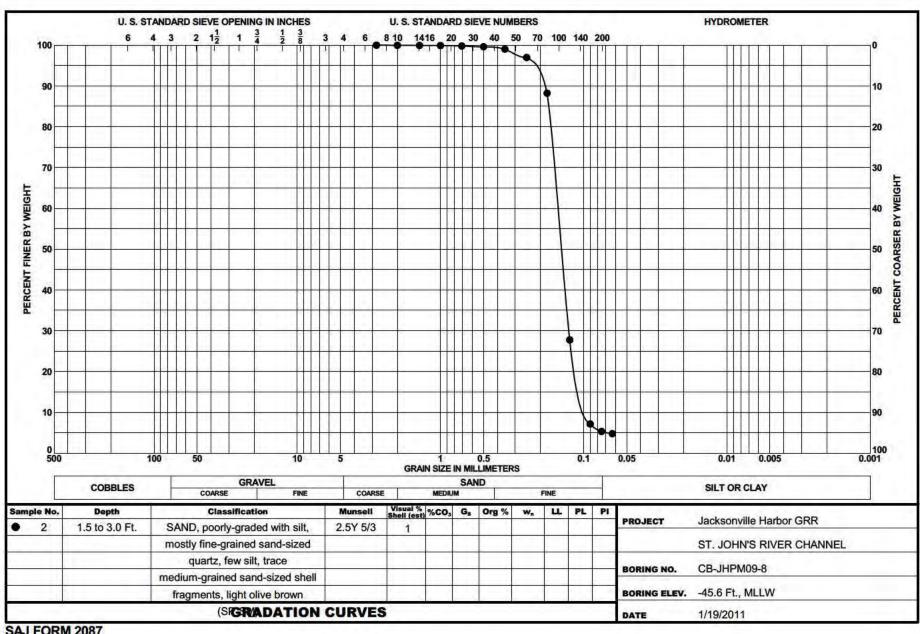


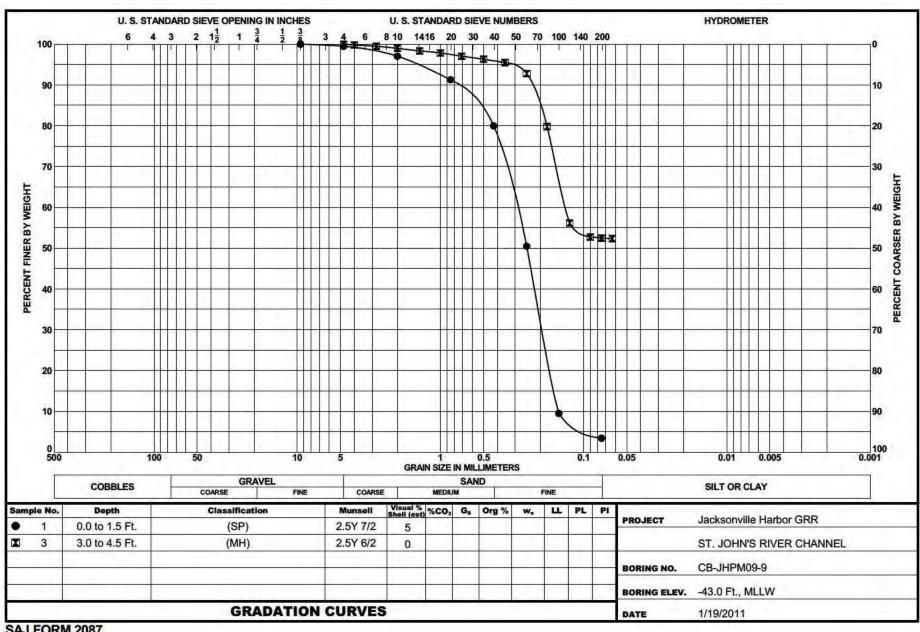


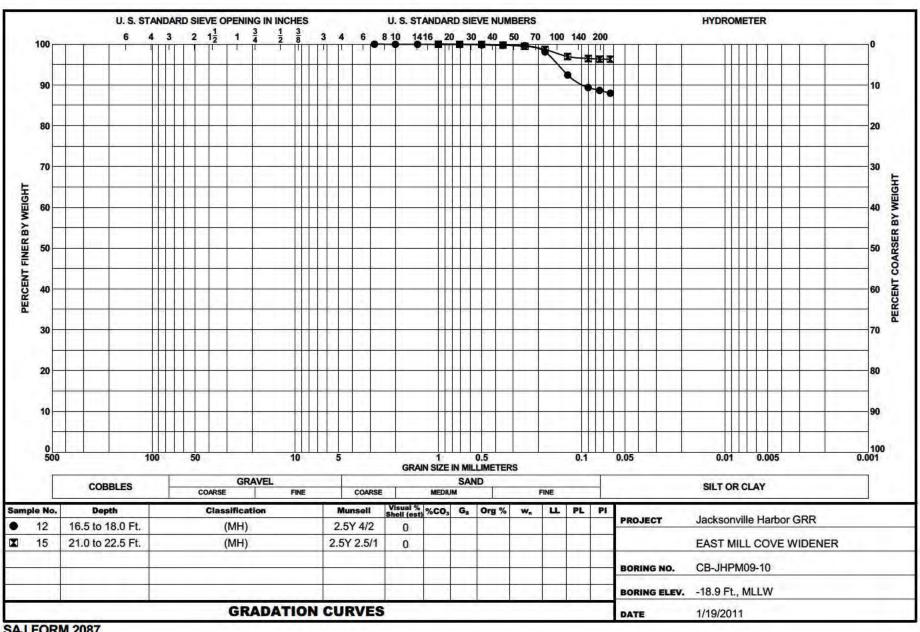


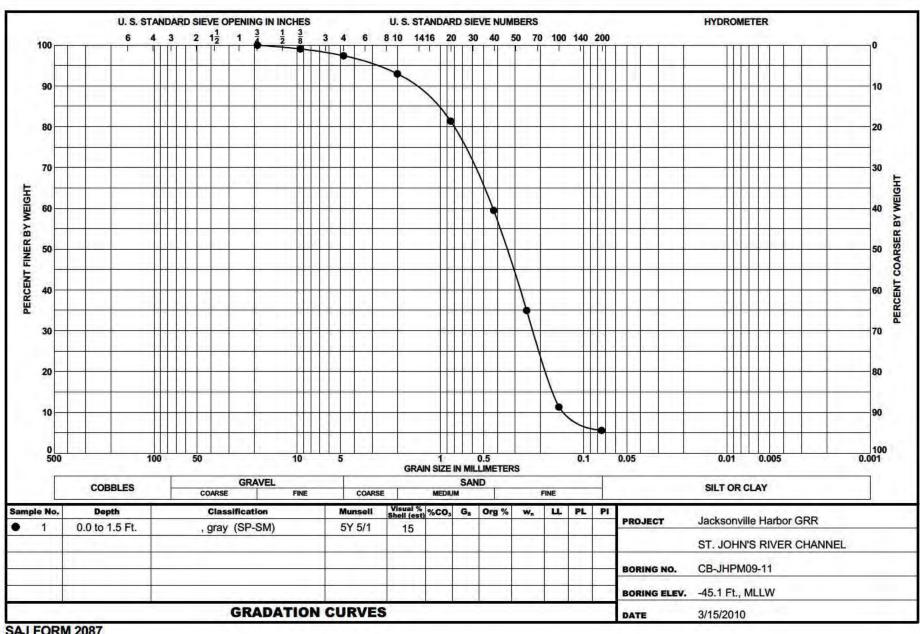


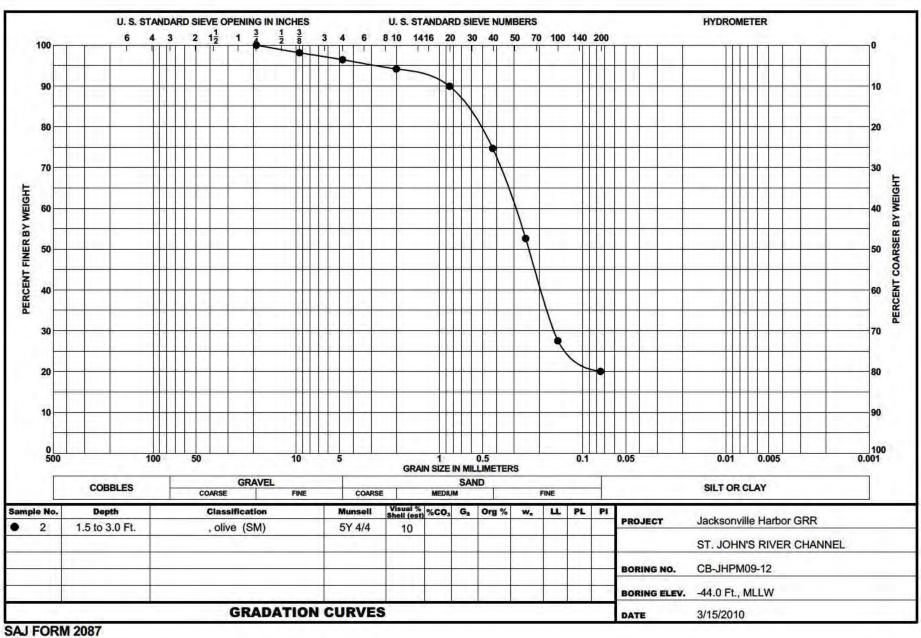
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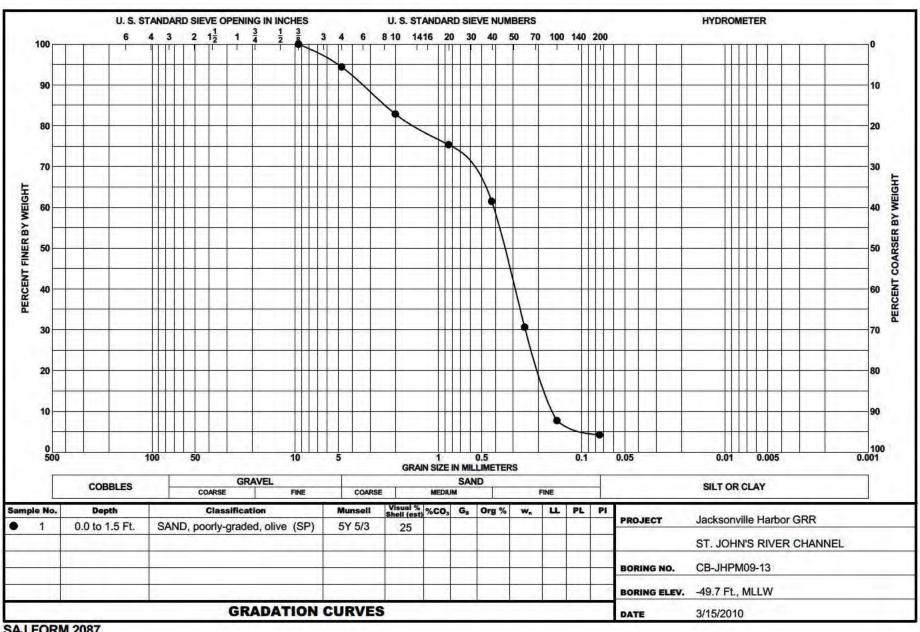


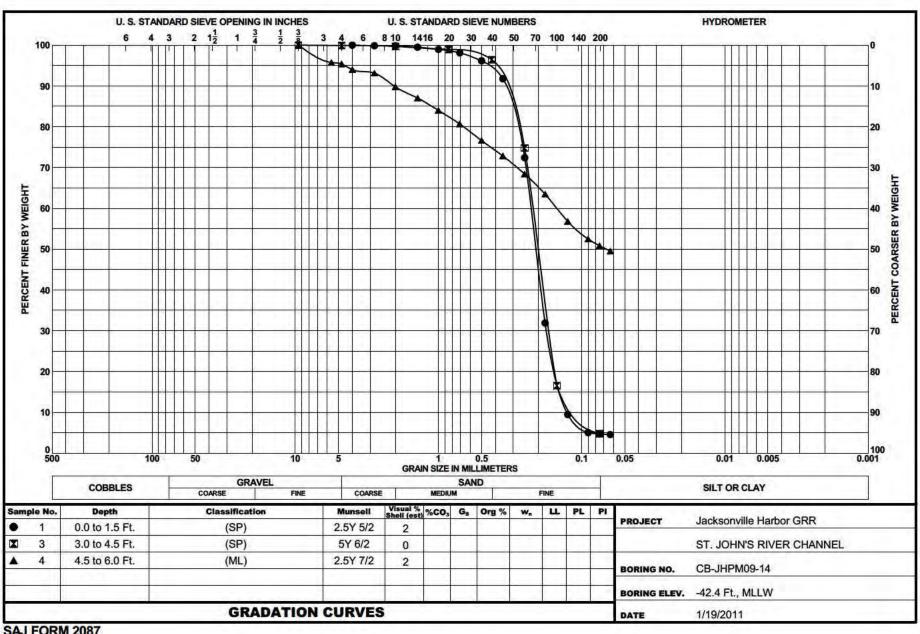


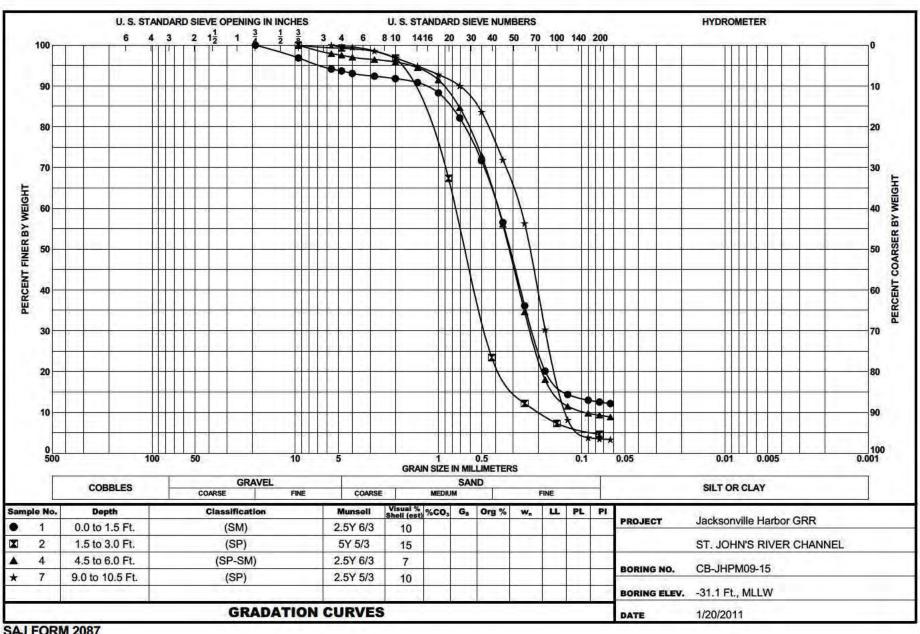


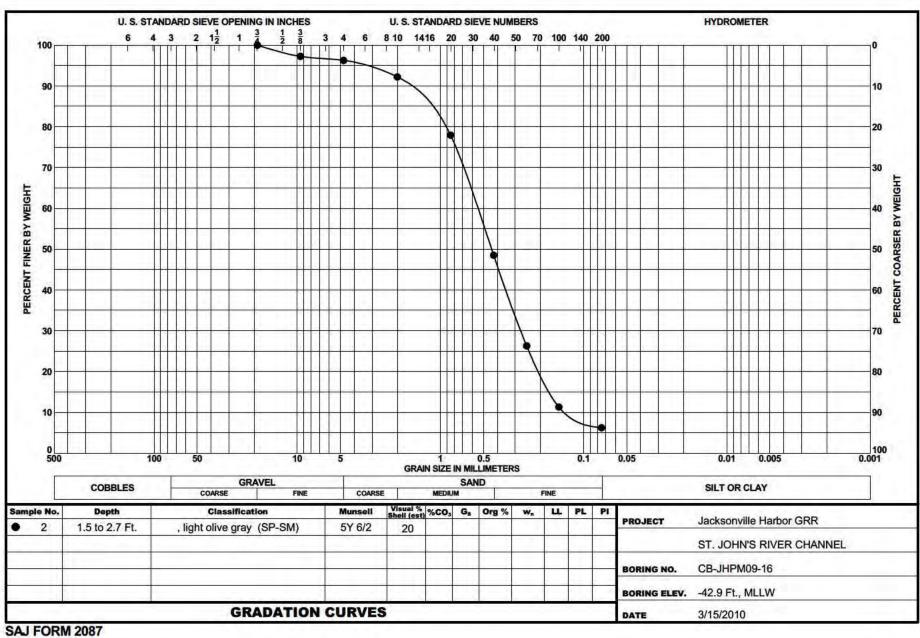


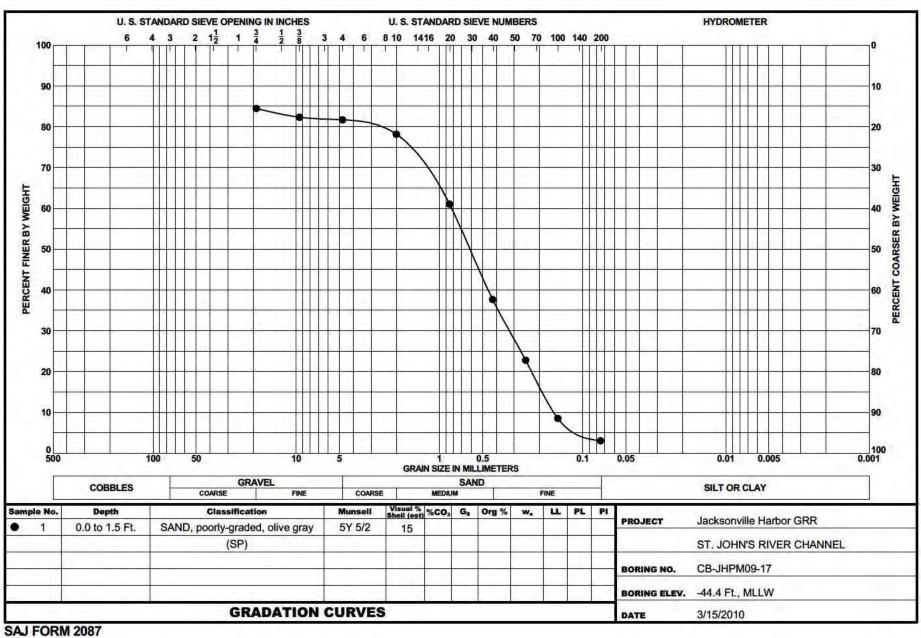
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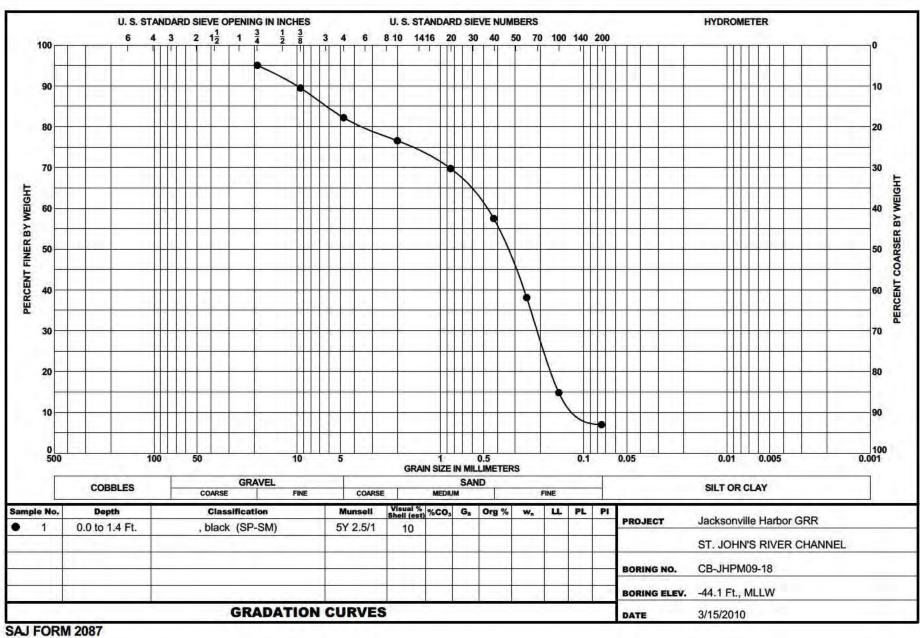


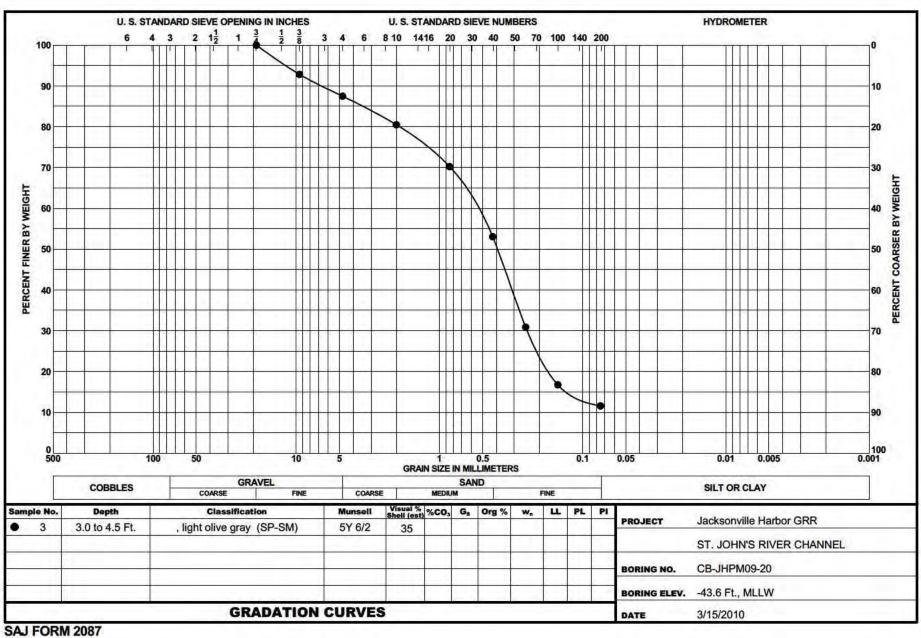


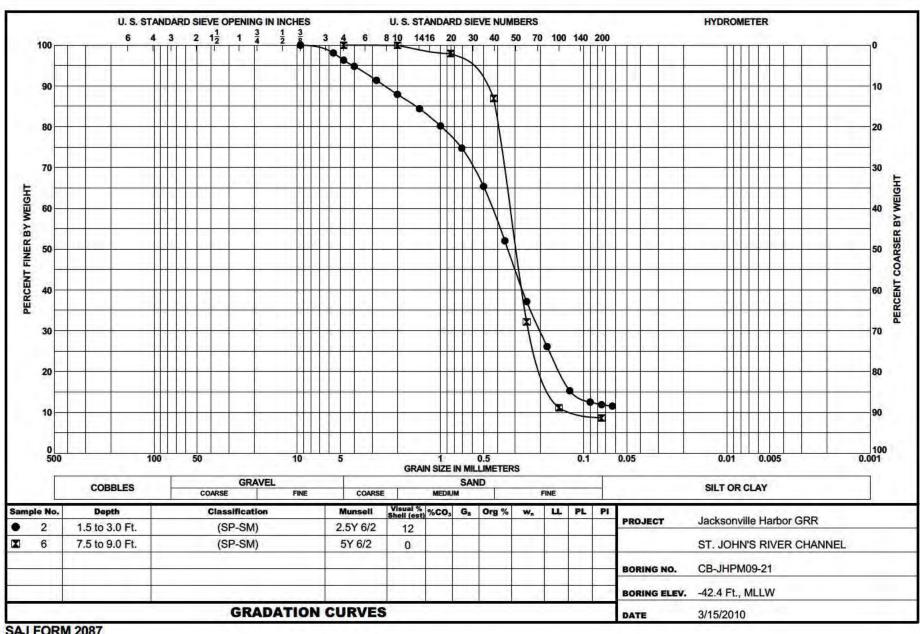


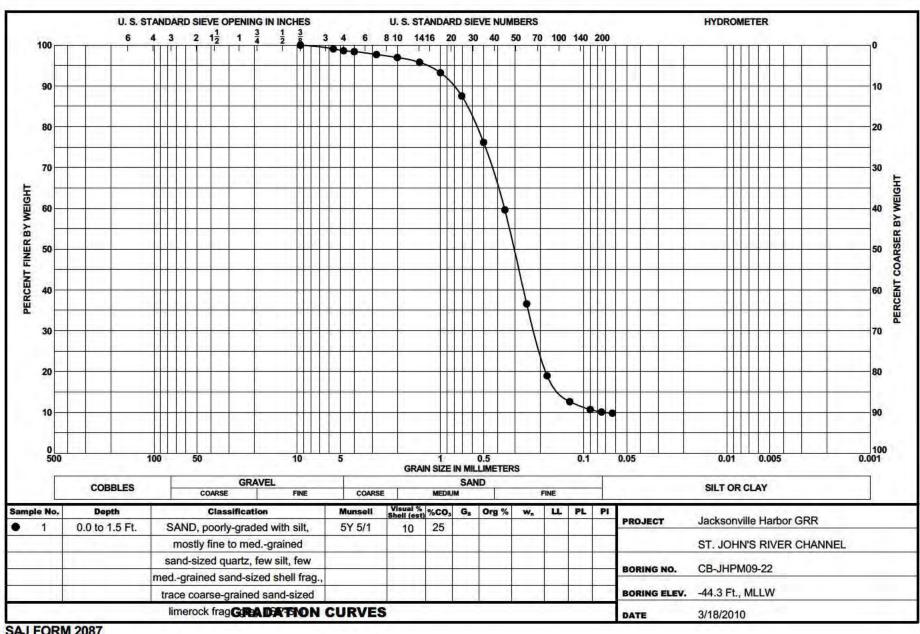


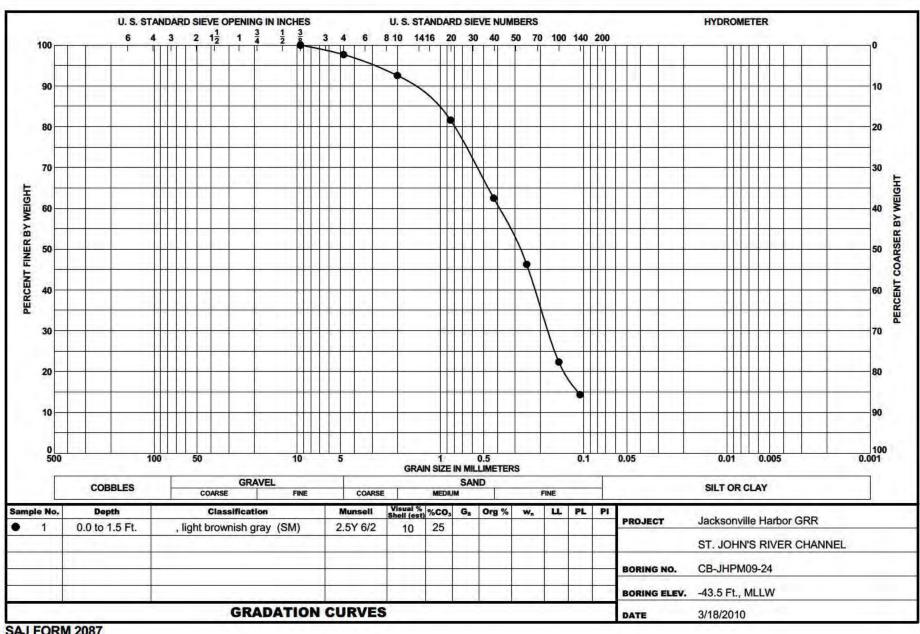


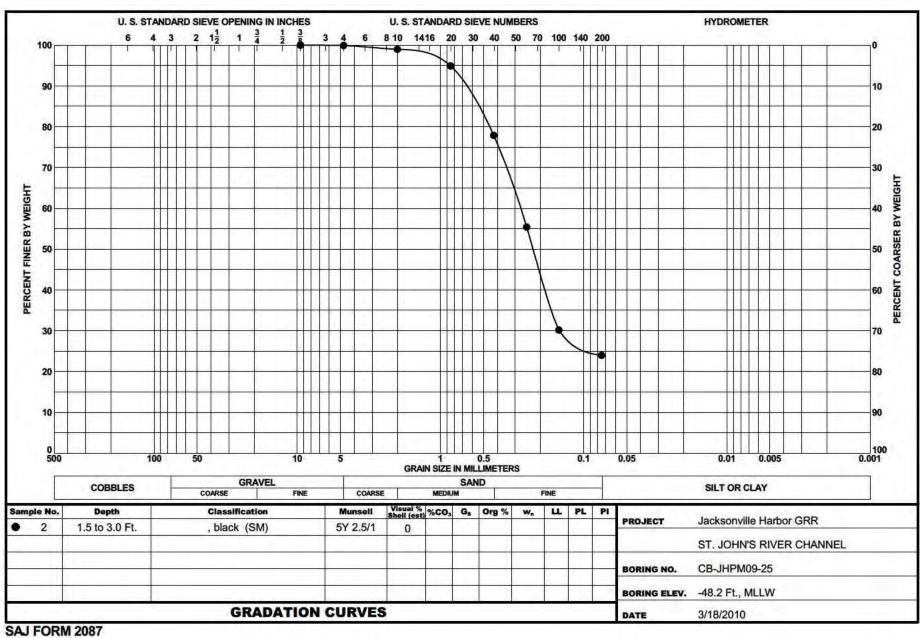


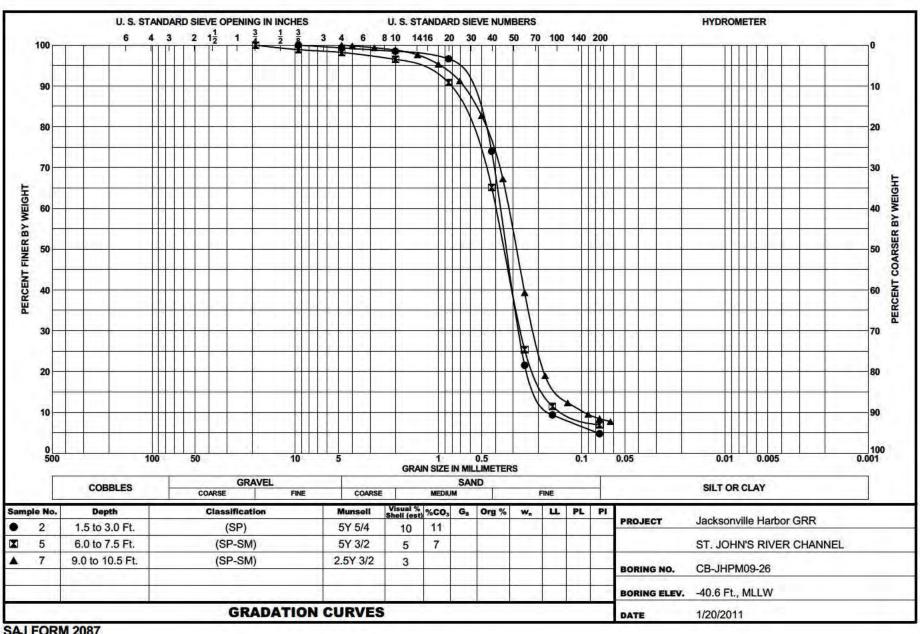


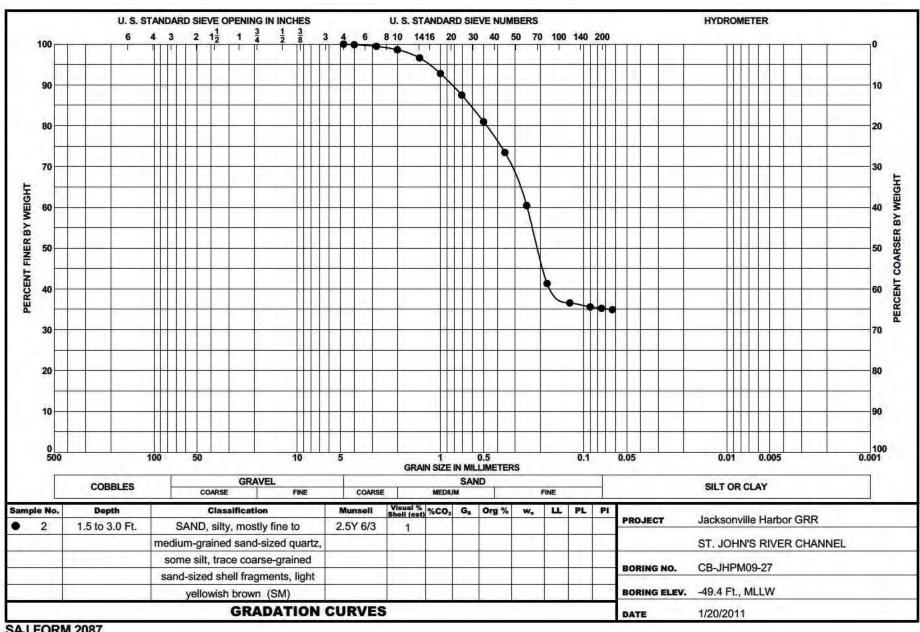


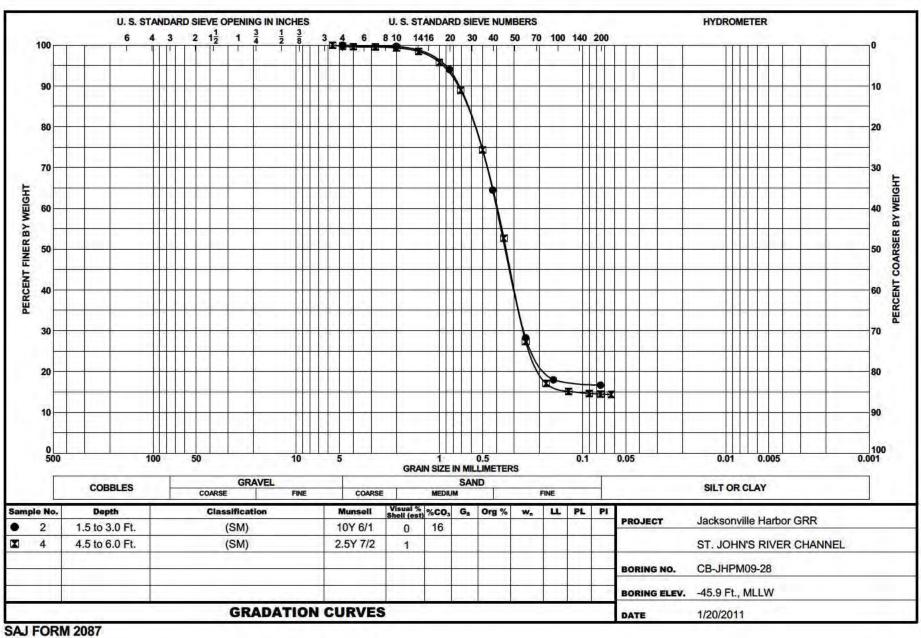


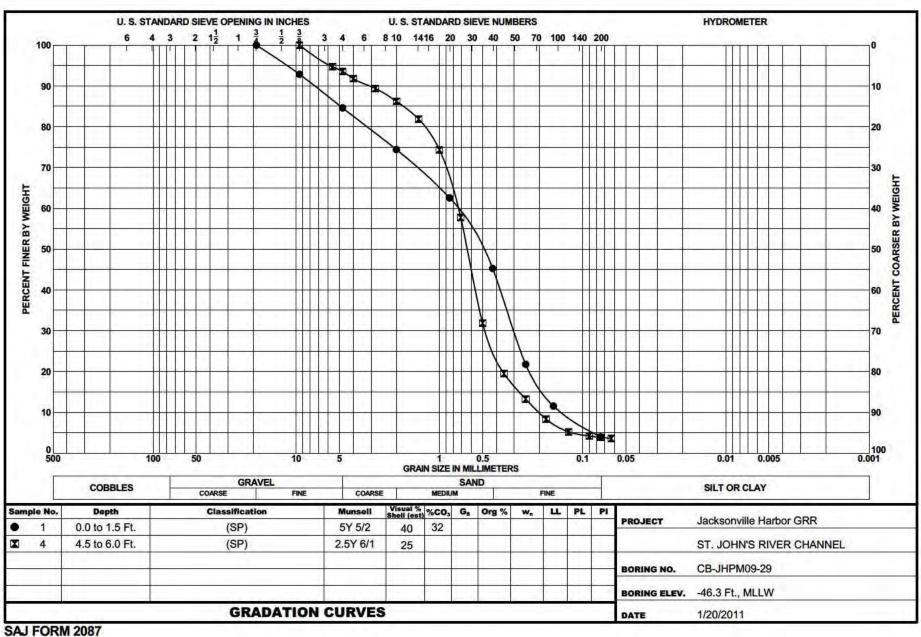


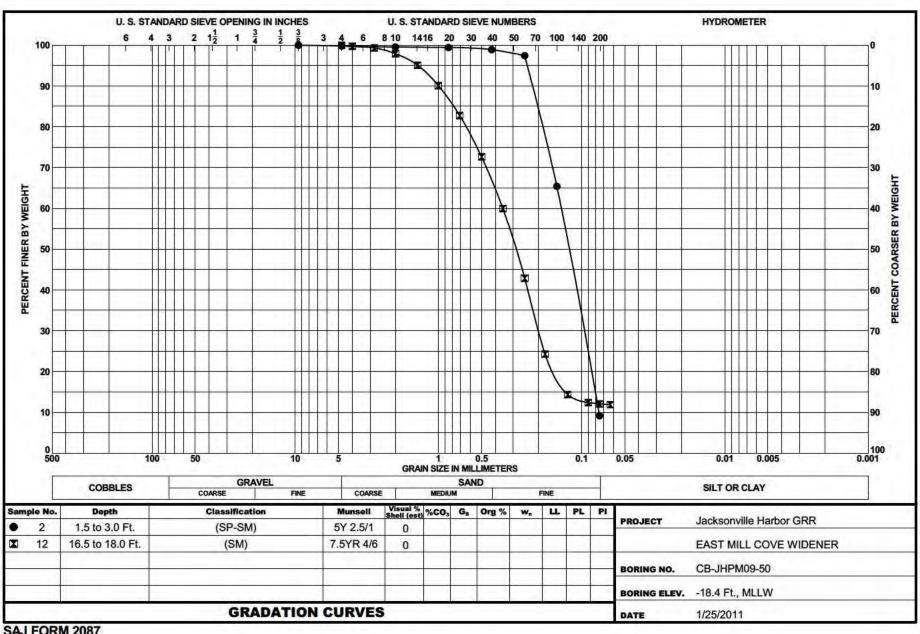


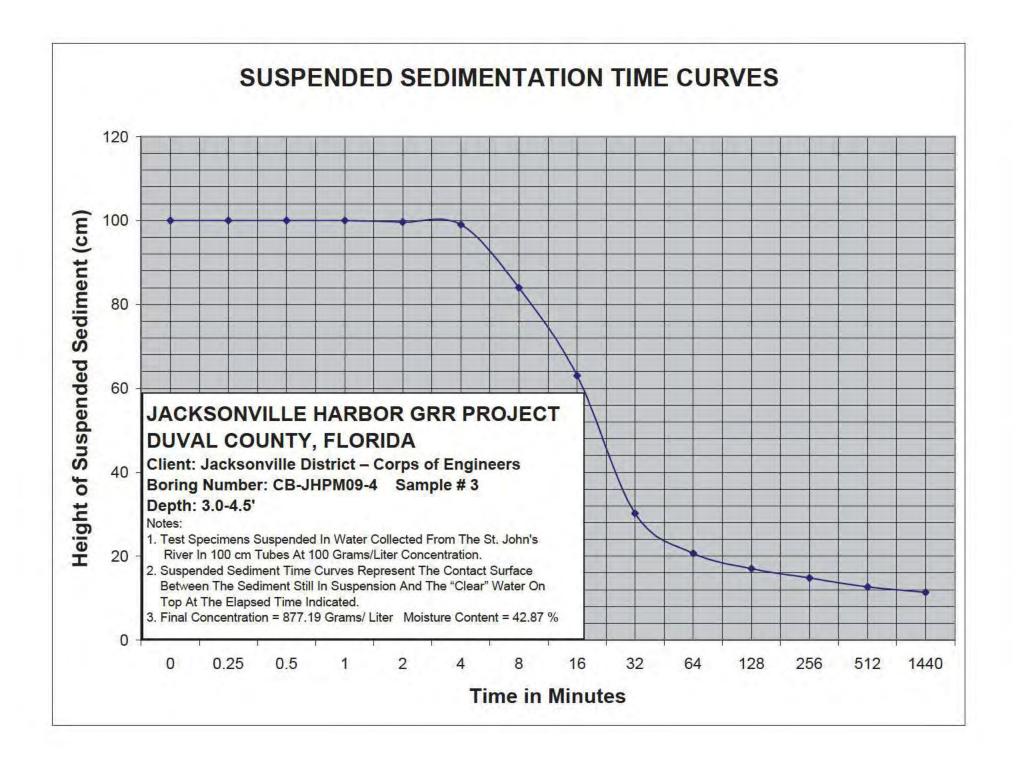


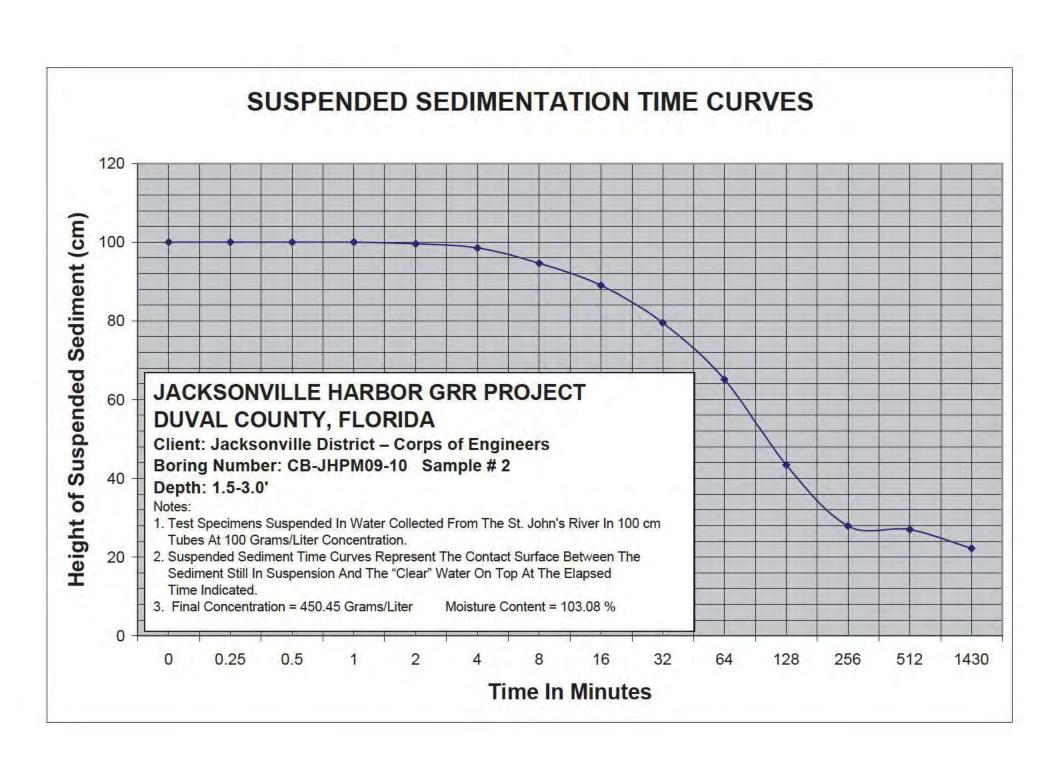


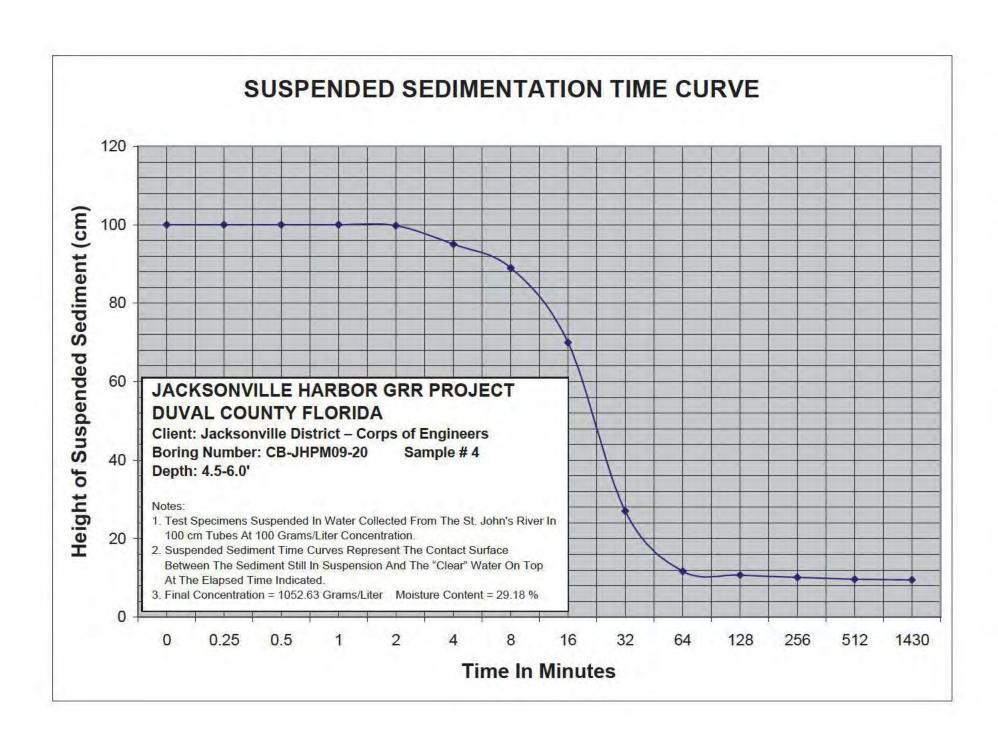


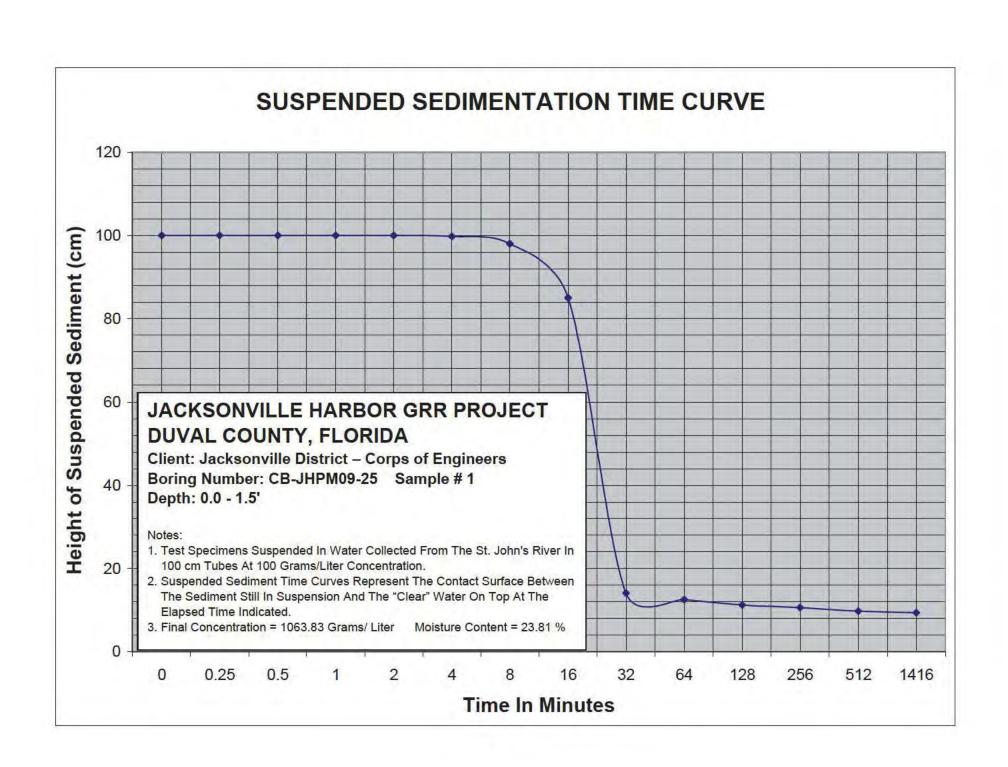


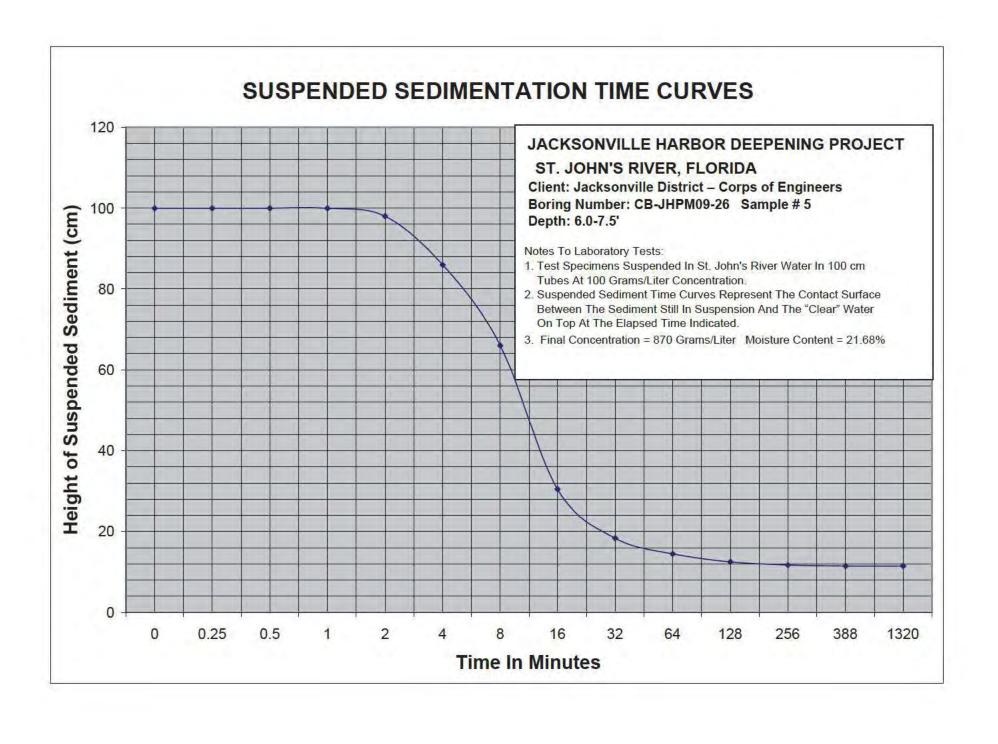


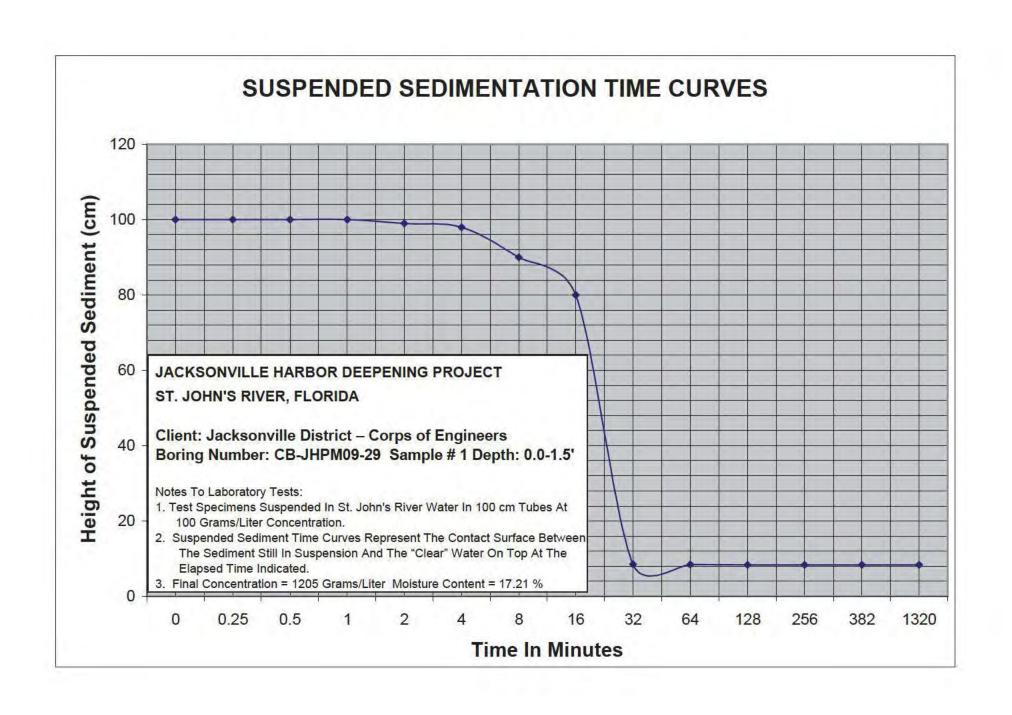




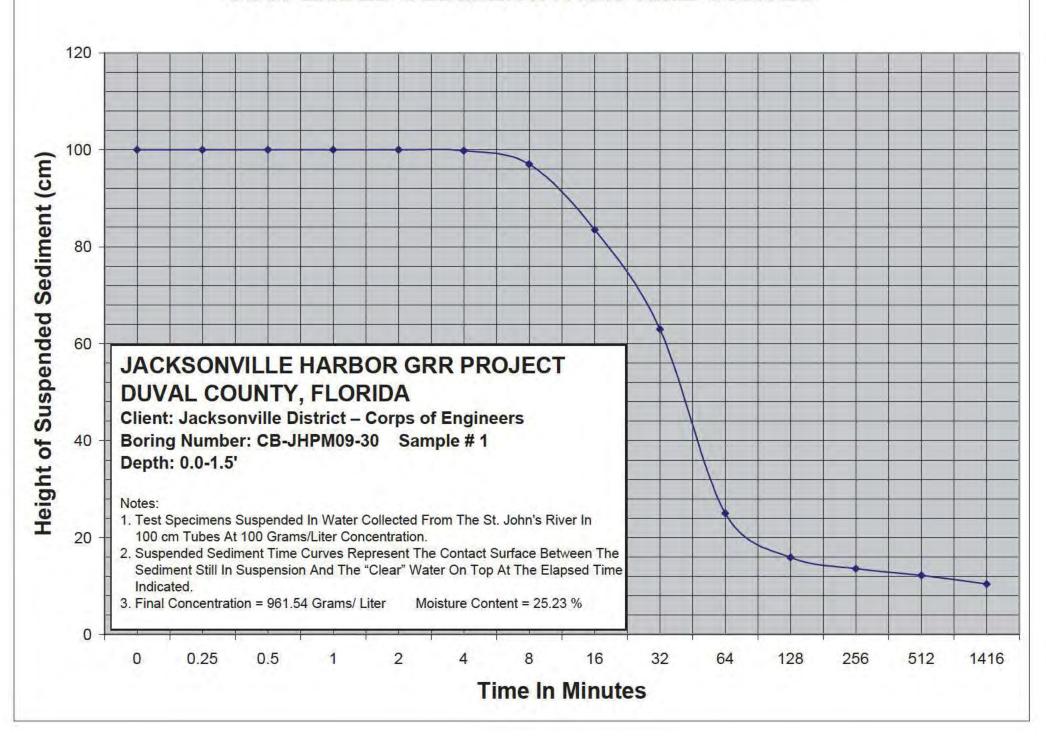








# SUSPENDED SEDIMENTATION TIME CURVES



## **COMPRESSIVE STRENGTH OF ROCK CORE SAMPLES**

#### **ASTM D2938**

#### JACKSONVILLE HARBOR GRR PROJECT

**JACKSONVILLE DISTRICT - US ARMY CORPS OF ENGINEERS** 

| CORE BORING<br>NUMBER | DEPTH<br>(FT.) | ELEVATION (MLLW) | RUN# | DIAMETER<br>(INCHES) | LENGTH (INCHES) | LOAD<br>(LBS) | AREA<br>( SQ. INCHES) | UNIT LOAD<br>(PSI) |
|-----------------------|----------------|------------------|------|----------------------|-----------------|---------------|-----------------------|--------------------|
| CB-JHPM09-2           | 5.2-6.0'       | -46.6            | 1    | 3.950                | 8.055           | 1750          | 12.57                 | 140                |
| CB-JHPM09-2           | 10.6-11.3'     | -52.0            | 2    | 3.950                | 8.025           | 72000         | 12.57                 | 5728               |
| CB-JHPM09-5           | 15.8-16.5'     | -59.2            | 1    | 3.950                | 8.000           | 3850          | 12.57                 | 306                |
| CB-JHPM09-6           | 4.0-4.5'       | -49.0            | 1    | 3.950                | 6.565           | 5000          | 12.57                 | 398                |
| CB-JHPM09-7           | 3.0-3.8'       | -47.8            | 1    | 3.950                | 8.075           | 30600         | 12.57                 | 2435               |
| CB-JHPM09-7           | 5.3-6.0'       | -50.1            | 1    | 3.975                | 7.925           | 11750         | 12.57                 | 935                |
| CB-JHPM09-9           | 15.8-16.5'     | -58.8            | 1    | 3.957                | 8.000           | 4250          | 12.57                 | 340                |
| CB-JHPM09-11          | 9.5-10.2'      | -54.6            | 1    | 3.975                | 8.000           | 10250         | 12.57                 | 815                |
| CB-JHPM09-16          | 5.5-6.2'       | -48.4            | 1    | 3.950                | 8.175           | 15100         | 12.57                 | 1201               |
| CB-JHPM09-16          | 6.8-7.2'       | -49.7            | 1    | 3.975                | 4.750           | 1700          | 12.57                 | 135                |
| CB-JHPM09-17          | 2.0-2.7'       | -46.4            | 1    | 3.940                | 8.125           | 5200          | 12.57                 | 414                |
| CB-JHPM09-18          | 1.8-2.5'       | -45.9            | 1    | 3.950                | 8.150           | 5100          | 12.57                 | 406                |
| CB-JHPM09-35          | 5.0-5.7'       | -50.7            | 2    | 3.975                | 7.650           | 19500         | 12.57                 | 1551               |
| CB-JHPM09-39          | 7.7-8.2'       | -50.1            | 1    | 3.975                | 8.050           | 8350          | 12.57                 | 664                |
| CB-JHPM09-40          | 11.8-12.5'     | -58.5            | 1    | 3.900                | 7.950           | 750           | 12.57                 | 60                 |
| CB-JHPM09-42          | 7.2-7.9'       | -47.0            | 1    | 3.950                | 8.025           | 24500         | 12.57                 | 1949               |
| CB-JHPM09-42          | 15.7-16.3'     | -55.5            | 3    | 3.980                | 7.000           | 6500          | 12.57                 | 517                |
| CB-JNPM09-45          | 16.7-17.4'     | -59.5            | 2    | 3.950                | 8.100           | 2500          | 12.57                 | 199                |
| CB-JHPM09-45          | 17.4-17.9'     | -60.2            | 2    | 3.975                | 5.850           | 2000          | 12.57                 | 159                |

NOTE: 1. TESTS WERE PERFORMED ON EACH DESIGNATED ROCK CORE IN A CALIBRATED RIEHLE
UNIVERSAL TEST MACHINE IN THE 0-150,000 RANGE AT A UNIFORM LOAD RATE BETWEEN 2-7 MINUTES PER CORE.

<sup>2.</sup> PHOTOGRAPHS WERE TAKEN OF EACH CORE PRIOR TO AND FOLLOWING THE APPLICATION OF LOADING WHEN THE ULTIMATE COMPRESSIVE STRENGTH WAS ACHIEVED AND FAILURE OCCURRED.

#### GRR2 DEEPENING STUDY – JETTY SLOPE STABILITY ANALYSIS MFR

EN-GS 1 March, 2013

#### S. Meyer

<u>Purpose.</u> To analyze the stability of the North and South Jetty both in their current condition and with the proposed harbor deepening.

<u>Geotechnical Investigation</u>. The geotechnical investigations and the geologic conditions encountered within the scope of study are presented as an attachment to this MFR. The Attachment includes core boring locations and associated representative data. Additional Investigations will be required to enhance the existing data to bring it to Plans and Specification standards.

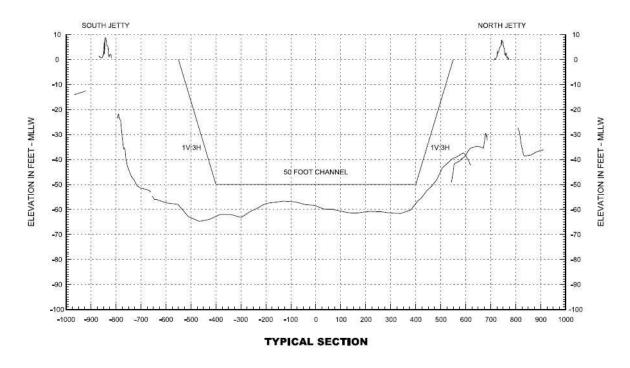
<u>Engineering Analysis and Assumptions.</u> This analysis evaluated the cross sections provided by EN-DW within the Jacksonville Harbor Bar Cut 3.



Figure 1. Approach Channel and Jacksonville Harbor Bar Cut 3.

Slope stability analyses were performed using SLOPE/W within the GeoStudio 2012 (Version 8.0) suite of software to determine the stability of the existing and proposed channel slopes in the vicinity of the North and South Jetty. The most critical (i.e., steepest slopes, most required slope cut) slope scenarios were analyzed. Engineering Manual (EM) 1110-2-1902 "Slope Stability" (dated 2003) was the guidance used. Slope geometry was based on information provided by a series of composite surveys performed between 2003 and 2012. It should be noted that several gaps in the survey data exist and some assumptions had to be made in geometry in order to perform the analyses. In addition, since the exact foundation elevations for both the north and south jetties are unknown, they were conservatively assumed to be at elevation -20.0 ft MLLW. Figure 2 shows an example cross section showing the survey gaps data.

### JACKSONVILLE HARBOR GRR2 CROSS SECTIONS FOR JETTY STABILITY (STA 160+00 TO STA 236+00)



NOTES:

- 1. SURVEY DATA OF JETTIES IS A COMBINATION OF MULTIBEAM AND LIDAR FROM SEPTEMBER 2010 (10-177).
- 2, SURVEY DATA OF CHANNEL WAS PROVIDED BY SRC AND IS COMPILATION OF DEEPEST DEPTHS ACHIEVED.
- 3. CHANNEL WIDTH REDUCES FROM 800 FEET TO 760 FEET WESTWARD OF STATION 198+63.

Figure 2. Typical Cross Section.

It should also be noted that boring information along the jetties is sparse, with borings being spaced more than 1,000 feet from some areas of interest and there are no lab samples associated with the samples. This led to several conservative assumptions about the subsurface conditions at the jetty locations. Therefore, as noted above, it is recommended that additional subsurface information be gathered at the most critical areas for the design phase of this project, as well as, the acquisition of more detailed as-built and survey information of the jetties.

<u>Existing Jetty Stability.</u> The results of the slope stability analyses indicate that the most critical area was the South Jetty, near Station 180+00, for which the surveys showed an existing side slope steeper than one foot vertical to one and a half feet horizontal (1V:1.5H). Figure 3 below shows the proposed channel cross section over the provided survey data.

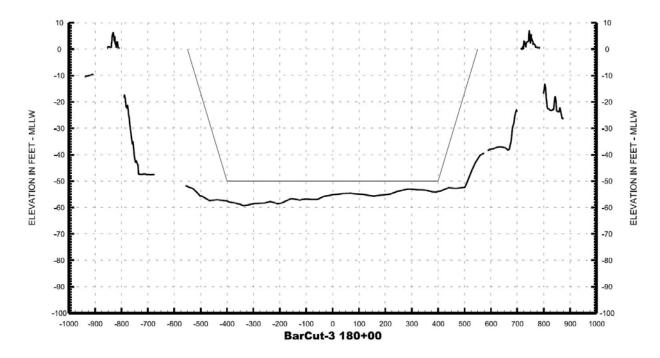


Figure 3. Station 180+00. Left side of the cross section represents the South Jetty.

Subsurface information used to estimate soil parameters was based on Boring CB-MPJ08-1, performed near the south side of the jetties near Station 198+00, and was the closest boring performed to the critical area. The soil parameters shown in Table 1 below were assumed based on the boring showing that the soils are fairly consistent with loose to medium dense sand throughout the encountered profile.

Table 1. Assumed Soil Parameters – S Strengths (Steady-State)

|                  | Unit Weight, pcf | Cohesion, psf | Phi |   |
|------------------|------------------|---------------|-----|---|
| Jetty Stone      | 145              | 0             | 45  | _ |
| Sands (SP_SM_SC) | 110              | 0             | 30  |   |

Figure 4 below shows the results of the analysis. The South Jetty in its current state has an inadequate factor of safety of 1.11.

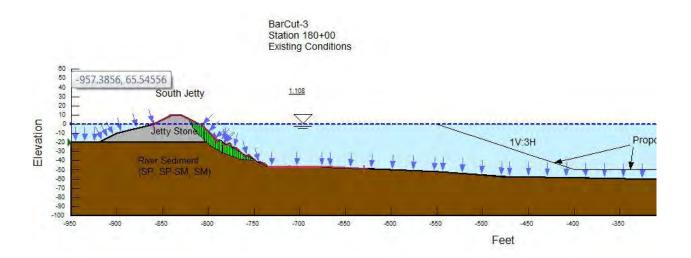


Figure 4. Existing Condition Results, FOS 1.11

The same surveys indicate there are several more areas for both the South and North Jetty where slopes are approaching 1V:1.5H. It should be noted that none of these areas will be impacted by the proposed harbor deepening, since they are in areas where the existing channel is both wide and deep enough that no dredging will be required. Also, design of jetty stabilization features was not performed as part of this study, as this is outside the scope of this project.

Jetty Stability with Recommended Plan. A slope stability analysis was performed to determine if the proposed dredge design template would impact the stability of the existing jetties located to the north and south of the proposed project. The most critical area was determined to be the North Jetty, near Station 213+00, for which surveys indicated that approximately 50 to 75 feet of horizontal cut of the existing slope will occur and the adjacent river bottom deepened by approximately 2 feet by the proposed dredging. In addition, by visual inspection it appears that this channel side slope is the steepest of the slopes that will be affected by the proposed deepening. Figure 5 below shows the proposed channel cross section over the provided survey data.

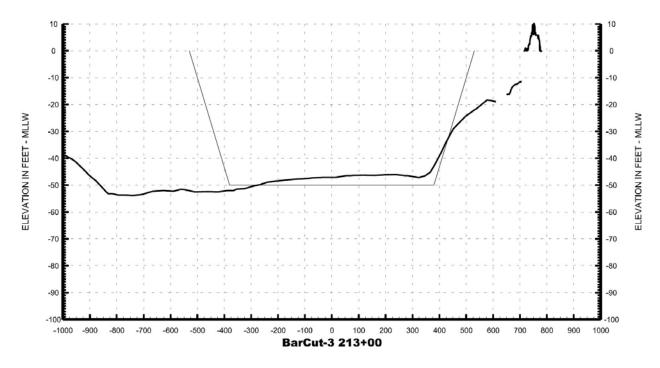


Figure 5. Station 213+00. Right side of the cross section represents the North Jetty.

Subsurface information used to estimate soil parameters was based on Boring CB-MPJ08-12, performed near the north side of the jetties near Station 213+00, and was the closest boring performed to the critical area. The soil parameters shown in Table 2 (end of construction) and Table 3 (Steady-State) below were assumed based on the boring showing multiple varying layers of sand, silt, and clay.

Table 2. Assumed Soil Parameters – Q Strengths (end of construction)

|                                   | Unit Weight, pcf | Cohesion, psf | Phi |
|-----------------------------------|------------------|---------------|-----|
| Jetty Stone, EL 10 to -20         | 145              | 0             | 45  |
| Sands/Shells, EL -20 to -35       | 120              | 0             | 34  |
| Clay (CH), EL -35 to -40          | 120              | 1,000         | 0   |
| Sand (SP), EL -40 to -44          | 125              | 0             | 36  |
| Clay (CH), EL -44 to -46          | 120              | 1,250         | 0   |
| Sands/Shells, EL -46 to -50       | 110              | 0             | 30  |
| Silt (ML), EL -50 to -52          | 100              | 225           | 0   |
| Sands/Shells, EL -52 to -61       | 115              | 0             | 32  |
| Sand (SP-SM), EL -61 to -64       | 110              | 0             | 30  |
| Silt (ML), EL -64 to 67           | 110              | 400           | 0   |
| Sand/Silt Mix, EL -67 to -71      | 115              | 0             | 31  |
| Silt/Clay (ML, CH), EL -71 to -76 | 120              | 1,000         | 0   |
| Sands (SP, SM), EL -76 to -81     | 115              | 0             | 31  |
| Sands (SP, SP-SM), EL -81 to -100 | 125              | 0             | 33  |

Table 3. Assumed Soil Parameters – S Strengths (Steady-State)

|                                   | Unit Weight, pcf | Cohesion, psf | Phi |
|-----------------------------------|------------------|---------------|-----|
| Jetty Stone, EL 10 to -20         | 145              | 0             | 45  |
| Sands/Shells, EL -20 to -35       | 120              | 0             | 34  |
| Clay (CH), EL -35 to -40          | 120              | 0             | 23  |
| Sand (SP), EL -40 to -44          | 125              | 0             | 36  |
| Clay (CH), EL -44 to -46          | 120              | 0             | 23  |
| Sands/Shells, EL -46 to -50       | 110              | 0             | 30  |
| Silt (ML), EL -50 to -52          | 100              | 0             | 18  |
| Sands/Shells, EL -52 to -61       | 115              | 0             | 32  |
| Sand (SP-SM), EL -61 to -64       | 110              | 0             | 30  |
| Silt (ML), EL -64 to 67           | 110              | 0             | 19  |
| Sand/Silt Mix, EL -67 to -71      | 115              | 0             | 31  |
| Silt/Clay (ML, CH), EL -71 to -76 | 120              | 0             | 26  |
| Sands (SP, SM), EL -76 to -81     | 115              | 0             | 31  |
| Sands (SP, SP-SM), EL -81 to -100 | 125              | 0             | 33  |

For the end of construction two different failure modes were evaluated, a circular failure surface near the dredge cut location and also a block failure through an identified weak silt layer between elevation - 48 and -50 MLLW. The controlling failure surface in this case was determined to be the block failure with a factor of safety of 1.33, which meets the requirements for minimum factor of safety for this project. Figure 6 and 7 below show the circular failure and block failure results, respectively.

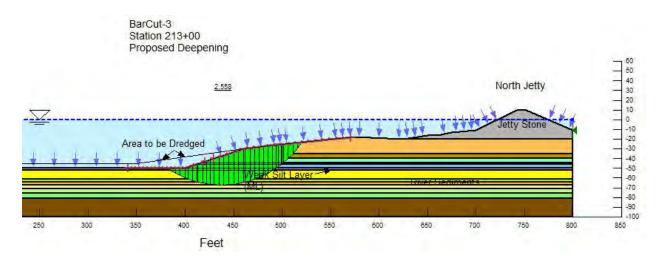


Figure 6. Circular Failure with Q Strengths, FOS 2.56

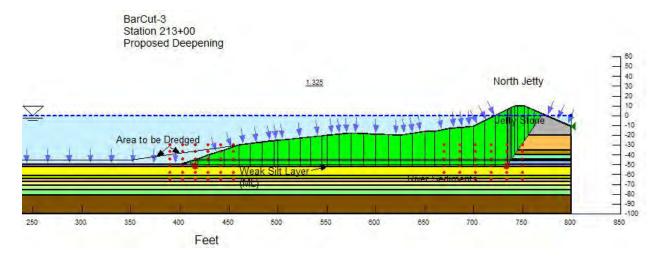


Figure 7. Block Failure through Weak Silt, Q Strengths, FOS 1.33

For the long term steady-state condition two different failure modes were evaluated, a circular failure surface near the dredge cut location and also a block failure of the jetty stone. The controlling failure surface in this case was determined to be the circular failure near the dredge cut with a factor of safety of 1.48, which meets the requirements for minimum factor of safety for this project. Figures 8 and 9 below show the different failure mode results.

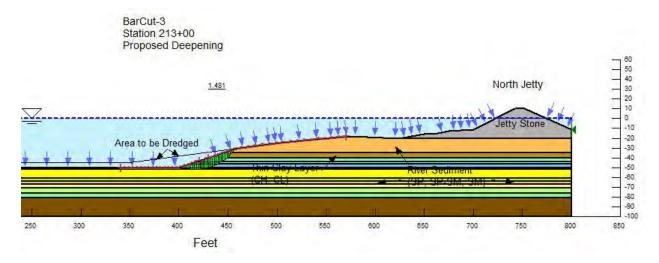


Figure 8. Circular Failure at the Dredge Cut, S Strengths, FOS 1.48

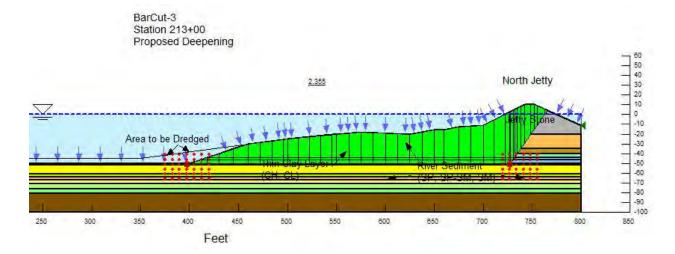


Figure 11. Block Failure at the Jetty Stone, S Strengths, FOS 2.36

<u>Conclusion.</u> Based on the results of these analyses the existing jetties are, at least at some locations, marginally stable with factors of safety that are below what is acceptable based on EM 1110-2-1902. However, these areas will not be affected by the proposed deepening since they are in areas where the existing channel is both wide and deep enough that dredging will not be required.

The proposed deepening will require dredging in some areas of the channel to widen and deepen the existing channel. Based on the results of these analyses the areas affected will have adequate factors of safety against slope stability as described in the EM.

Again, it should be noted that there are several gaps in the survey data and limited subsurface information. Additional investigations and analyses will be required to bring these analyses to Plans and Specifications standards.